IMPORTANT

Before you remove the Wire-Seal, check the contents of this envelope with the listing on the front of the envelope. If any part is missing, your Howard W. Sams distributor will replace the entire PHOTOFACT set IF the Wire-Seal has not been damaged.

This PHOTOFACT Folder Set is

WIRE-SEALED FOR YOUR PROTECTION

to guarantee completeness of contents

DO NOT ACCEPT IF SEAL HAS BEEN BROKEN

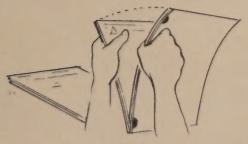
TO OPEN ***JUST DO THIS:***

1

Take hold of the Set with both hands. Place your thumbs directly under the top wire-seal; then, divide the contents equally by putting your thumbs midway through the thickness of the Set. Now, pull the two sections apart at the top, firmly.

2

Repeat this process, pulling close to the wire-seal at the bottom, so that the set is now divided into two equal parts.



3

Continue this "pulling-apart" process with the section in which the wire-seals remain, dividing it in half.

4

Finally, remove the wire-seals left in the last section; this can easily be done with your fingernail or any sharp instrument.

Your "Safety-Sealed" PHOTOFACT Set is now ready for profit-making use . . .

IMPORTANT

Before you remove the Wire-Seal, check the contents of this envelope with the listing on the front of the envelope. If any part is missing, your Howard W. Sams distributor will replace the entire PHOTOFACT set IF the Wire-Seal has not been damaged.

The PHOTOFACT® Servicer

SET 520 ★ *Published for all users of Howard W. Sams' Photofact Folders* ★ FEB. 1961

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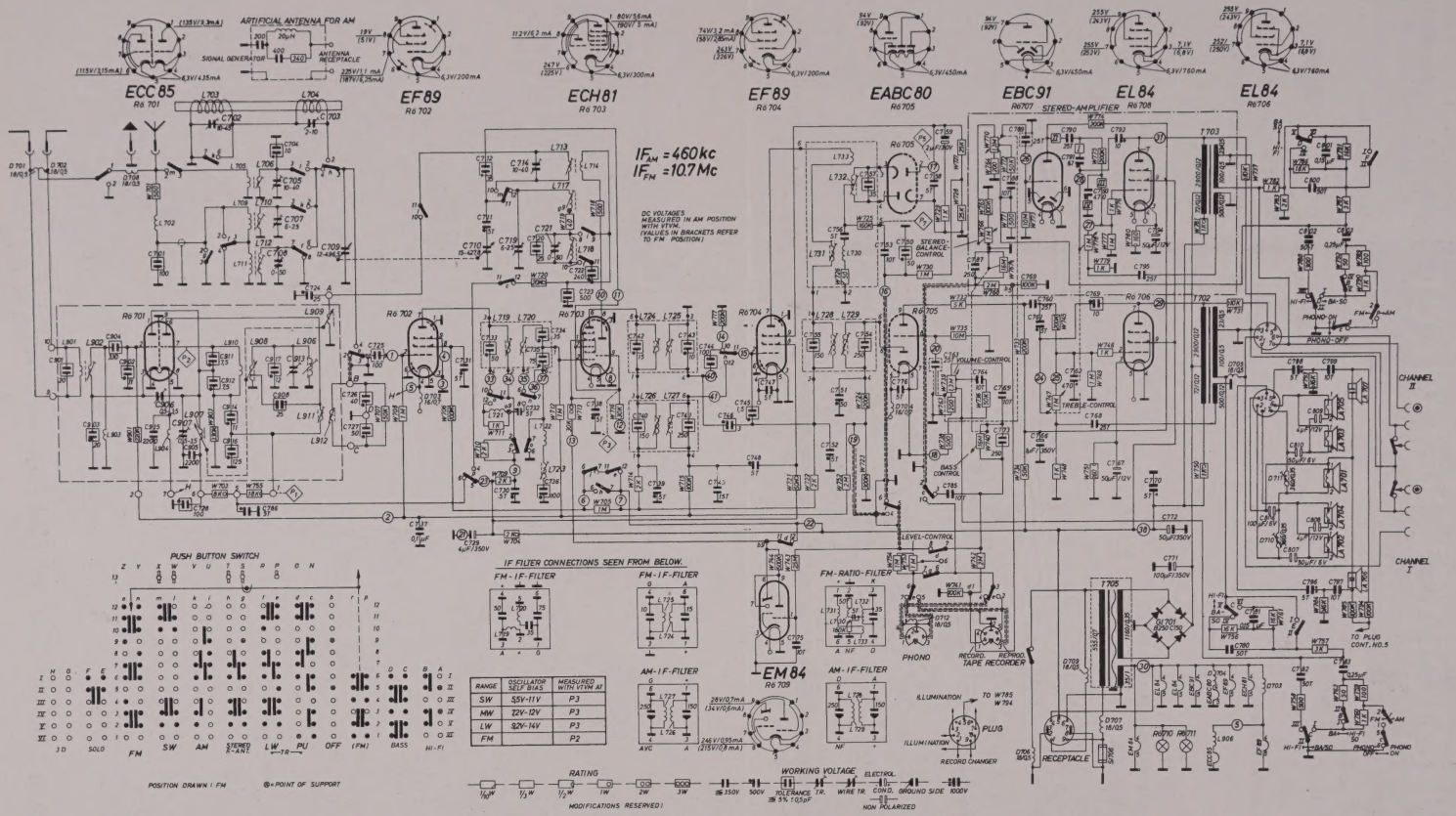
This Servicer provides you with essential data on other models or special equipment not covered in standard PHOTOFACT folders. The schematics and supplementary data included here will be of valuable help to you in servicing this equipment.

IN THIS ISSUE OF THE SERVICER:

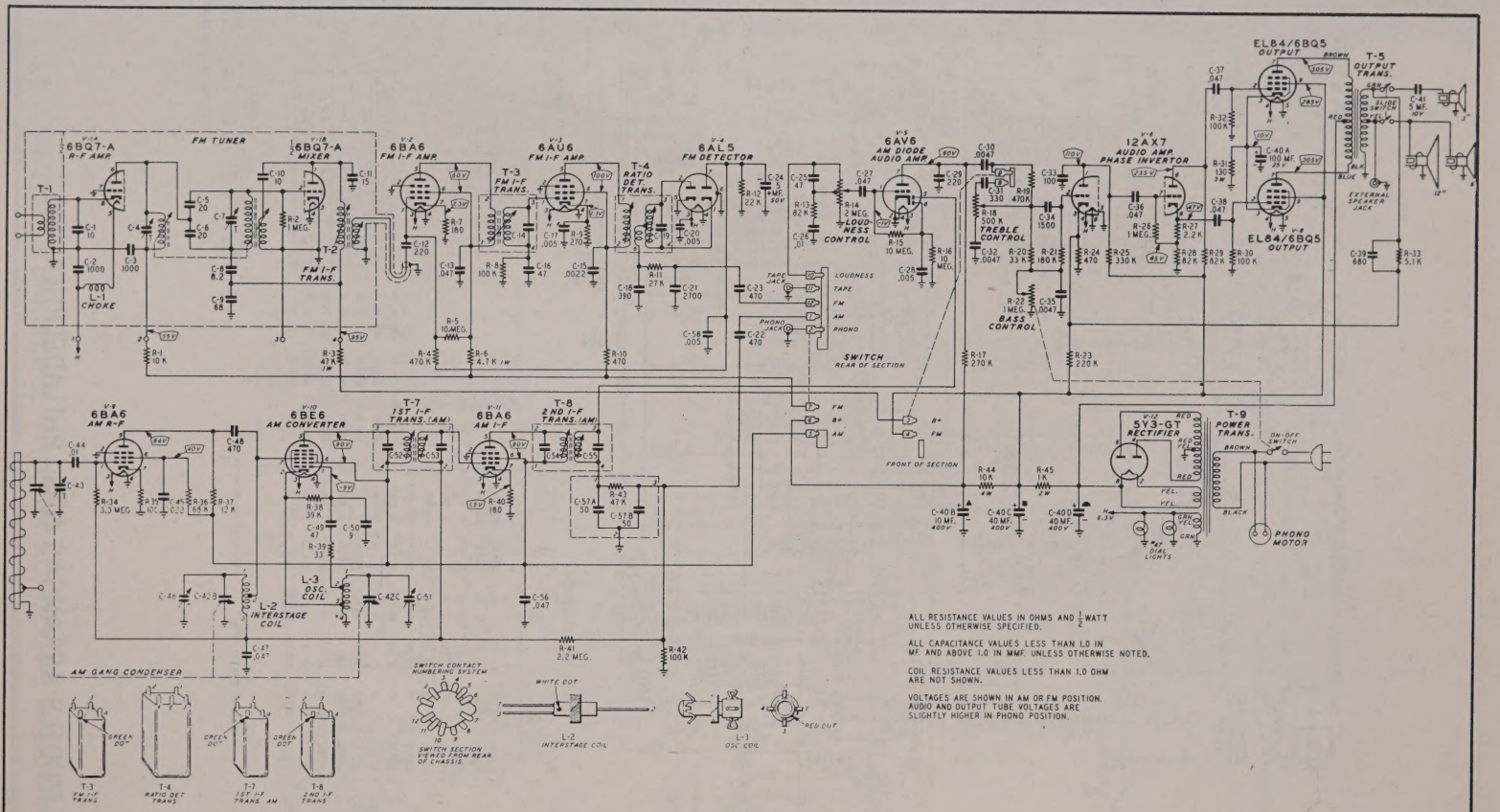
Airline Models
WG-2660A, WG-2661A,
WG-2662A, WG-2663A

Blaupunkt Models
Arkansas 4638,
Philadelphia 4653



BLAUPUNKT MODELS ARKANSAS 4638, PHILADELPHIA 4653

Schematic Diagram Courtesy of Blaupunkt: Importer N. Pickens Import Company



AIRLINE MODELS WG-2660A, WG-2661A, WG-2662A, WG-2663A

Schematic Diagram Courtesy of Montgomery Ward & Company

PHOTOFACT® Folder

INDEX

A cumulative index is included as a part of this Folder. Upon finding that a new tube is not listed on the roll chart of a tester covered in this service, refer to the latest Tube Tester Data Index to determine in which PHOTOFACT Set the data was published. If listed, reference to that Folder will provide the necessary data.

TUBE TYPES	JACKSON 598, 648, and 658 See PHOTOFACT Set No.	TUBE TYPES	JACKSON 598, 648, and 658 See PHOTOFACT Set No.	TUBE TYPES	JACKSON 598, 648, and 658 See PHOTOFACT Set No.
1H2	500	6FE5	500	12DW7	504
1N2	500	6FE8	500	12DY8	516
2ES5	500	6FG5	500	13EM7	512
2EV5	512	6FG7	516	14GT8	500
2FY5	512	6FQ5	512	15EW6	508
3DG4	500	6FS5	520	17EW8	508
3EV5	512	6FV8	504	22DE4	500
4ES8	520	6FW5	520	34GD5	508
4GS8	516	6FW8	500	35GL6	500
6CD7	512	6FY5	508	50BM8	504
6CW7	504	6GM6	500	50FE5	500
6EH7	500	6GY8	504	7167	508
6EJ7	500	6HJ8	516	7408	500
6EM7	500	6HS8	520	7543	500
6EQ7	516	7DJ8	504	7591	504
6EU7	500	8ET7	516	7695	512
6EV5	500	9EF6	508	7701	520
6EV7	504	10EW7	504	7716	520
6EW7	504				

JACKSON MODEL 598

SET 520

SUPPLEMENTS LATEST ROLL CHART 598-3

Tube Type	A.	B.	Fil. C.	Cont.	D.	E.	F.	G.
4ES8	4.2	4Z		5	6	7		30
	"	4Z			1	2		30
6FS5	6.3	3Y		4	5	1	6	54
6FW5	6.3	2Y		7	5	1	8	18
6HS8	6.3	4Z		5	3	6	2	60
	"	4Z			8	9	2	60
7701	Set line to 80% mark							
	12.6	4	389	5	6	2	7	20
7716	Set line to 80% mark							
	12.6	4Y		5	9	7	8	22
	"	4Z			3	2		38

JACKSON MODEL 648

SET 520

SUPPLEMENTS LATEST ROLL CHART 648-24

Tube Type	Fil.	D.	E.	Plate Test
4ES8	4.2	123	A45	16 YZ
	"	127	A89	16 YZ
6FS5	6.3	A234	AC156	53 V
6FW5	6.3	A124	C367	48 VW
6HS8	6.3	124679	358	70 XZ
	"	123489	AB567	70 XZ
7701	Set line to 80% mark			
	12.6	123	AC589	21 WZ
7716	Set line to 80% mark			
	12.6	A128	679	43 Z
	"	A124	A35	26 XZ

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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TUBE TESTER DATA • SET 520

JACKSON
MODEL 658

SET 520

SUPPLEMENTS LATEST ROLL CHART 658-3

Tube Type	Sec.	Heater	Circuit H-K	P-G	Plate	Grid Test	Heater Current
4ES8	T	4.0L	127	a89	20S	15WY•	
	T	"	123	a45	"	15WY•	A10.6L Z600
6FS5	P	6.4J	124	ac356	62R	5WY•	
6FW5	P	6.4N	124	c367	11Q	95VY•	
6HS8	P	6.4J	124679	358	54S	10XY•	
	P	"	123489	ab567	54S	10XY•	
7701	P	13.6K	123	ac589	44Q	60VY•	
7716	P	13.6K	128	679	29R	35VY•	
	T	"	124	a35	30R	10XY•	

PHOTOFACT® Folder

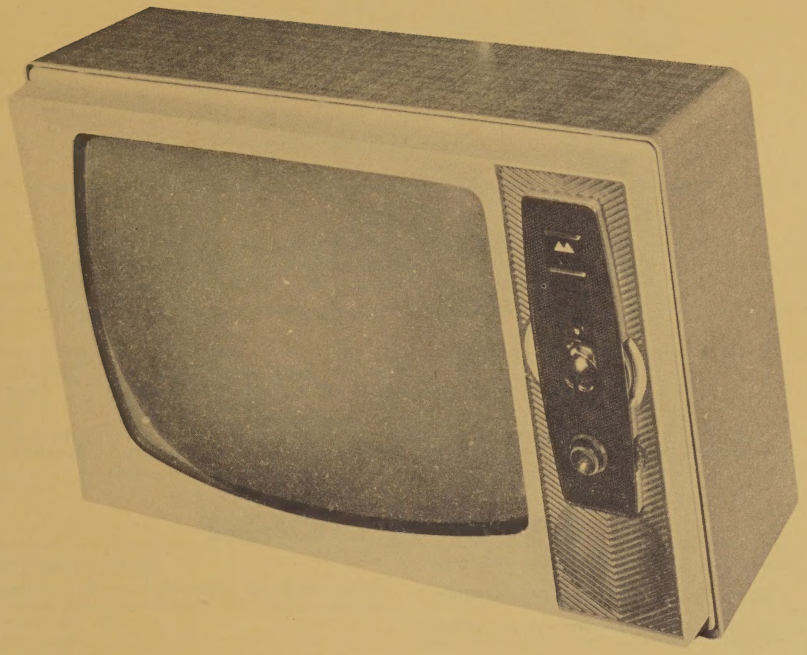
AIRLINE MODELS
WG-4224A, WG-4324A

IMPORTANT FILING NOTICE

The TV Folder for this envelope will be found among the first folders in this complete Set of folders.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.

AIRLINE MODELS
WG-4224A, WG-4324A



MODEL WG-4224A

AIRLINE MODELS
WG-4224A, WG-4324A

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DATE 2–61 SET 520 FOLDER 1

SET 520 FOLDER 1

AIRLINE MODELS WG-4224A, WG-4324A

AIRLINE MODELS WG-4224A, WG-4324A

MODEL WG-4224A

CAUTION

ONE SIDE OF AC LINE CONNECTED TO CHASSIS.

Care should be exercised when connecting test equipment or physically contacting chassis. Isolation devices employed by manufacturer should be checked and properly connected before returning receiver to owner.

TRADE NAME	Airline, Models WG-4224A, WG-4324A
SUPPLIER	Montgomery Ward & Co., 619 Chicago Avenue, Chicago, Illinois
TYPE SET	Television Receiver
TUBES	VHF - Sixteen, UHF - Seventeen
POWER SUPPLY	110-120 Volts AC, 60 Cycle RATING VHF - 160 Watts, 1.5 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

SERVICING IN THE FIELD

SAFETY GLASS REMOVAL

It is necessary to remove the chassis and picture tube for safety glass cleaning and removal. (See "Disassembly Instructions", Page 16.)

FUSE DEVICE

A 7.5Ω fusible resistor is used for low voltage power supply protection. (For location, see "Tube Placement Chart".)

TUNER OSCILLATOR ADJUSTMENT

To touch up VHF Oscillator, remove knobs and front panel.

AGC

The AGC may be varied by means of an AGC Control. (For location, see "Tube Placement Chart".)

SYNC STABILITY

Sync stability may be varied by means of a Sync Stability Control. (For location, see "Tube Placement Chart".)

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

The Horizontal Frequency Slug is used for the Horizontal Hold. (For location, see "Tube Placement Chart".)

HORIZONTAL DRIVE

The horizontal drive may be varied by a Horizontal Drive Trimmer. (For location, see "Tube Placement Chart".)

BUZZ ADJUSTMENT

To eliminate intercarrier buzz, adjust the Buzz Control for MINIMUM buzz and maximum sound. (For location, see R8 in Photo "Chassis - Top View".)

CENTERING

Centering is accomplished by 2 magnetic rings, located behind the yoke, on the neck of the picture tube.

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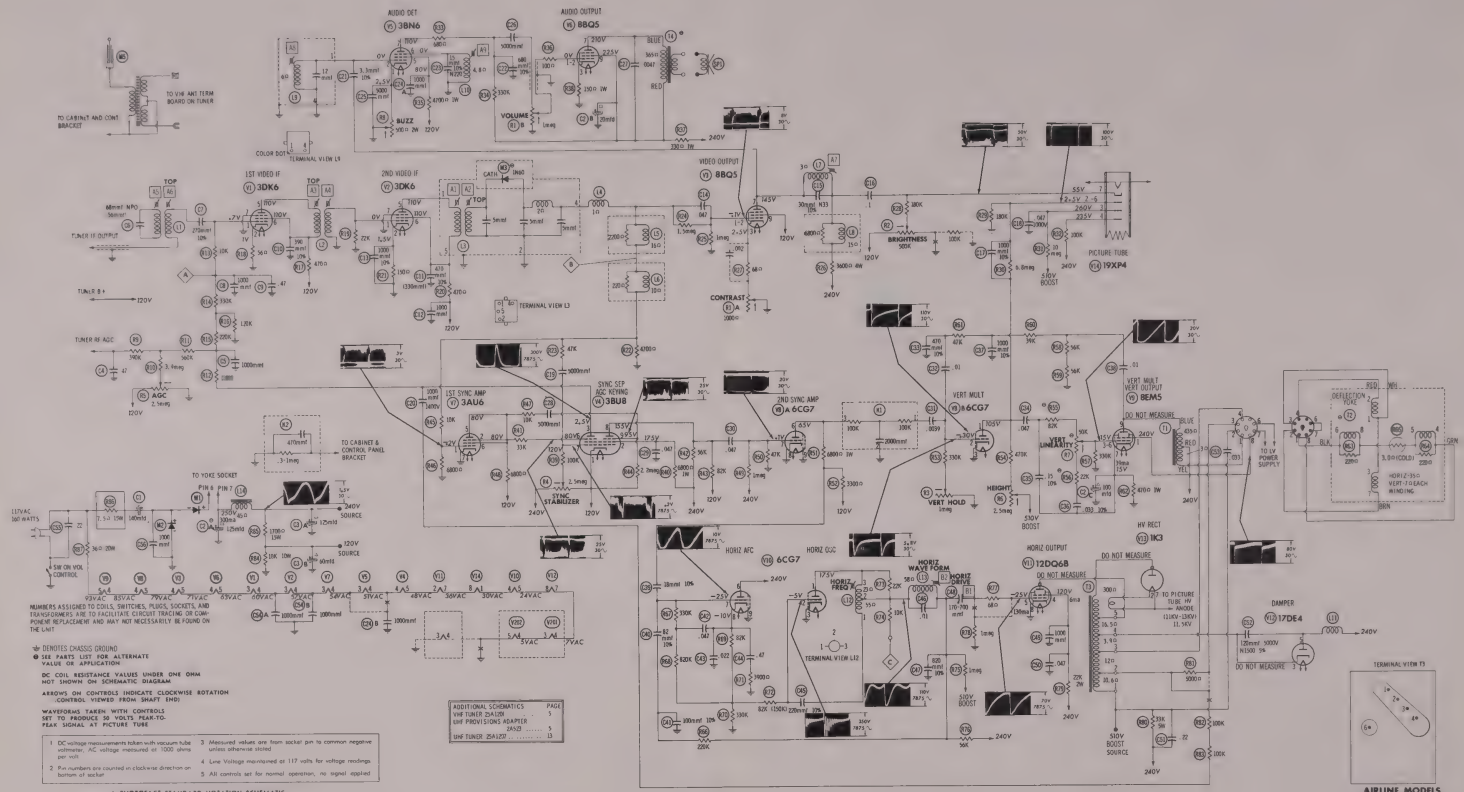
KA522

DATE 2-61 SET 520 FOLDER 1

SET 520 FOLDER 1



NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

⏚ DENOTES CHASSIS GROUND

● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM.

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION CONTROL VIEWED FROM SHAFT END)

WAVEFORMS TAKEN WITH CONTROLS SET TO PRODUCE 50 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE

1 DC voltage measurements taken with vacuum tube voltmeter. AC voltage measured at 1000 ohms per volt.

2 Pin numbers are counted in clockwise direction on bottom of socket

3 Measured values are from socket pin to common negative unless otherwise stated

4 Line Voltage maintained at 117 volts for voltage readings

5 All controls set for normal operation, no signal applied

ADDITIONAL SCHEMATICS — PAGE
VHF TUNER 25A128 3
UHF PROVISIONS ADAPTER 24A5 5
UHF TUNER 25A129 13

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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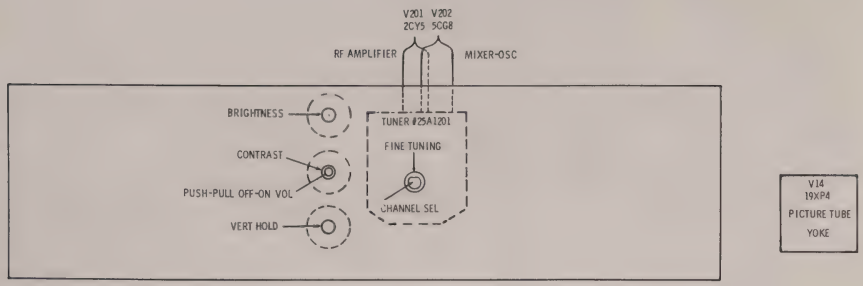
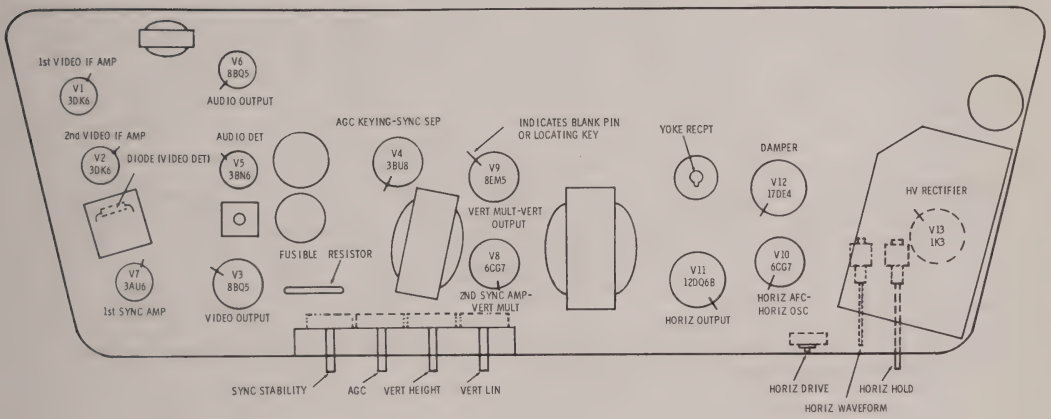
TUBE PLACEMENT CHART



TOP VIEW



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce indicated symptoms. Refer to tube placement chart for location and type of tube.

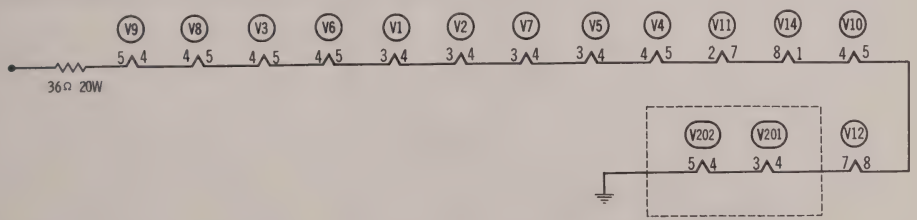
POWER SUPPLY FAILURE
No raster, no sound Fusible Resistor, Rectifiers (B+)

SWEEP FAILURE
No raster, has sound V10, V11, V12, V13, V14
No vertical deflection V8, V9
Poor vert. linearity or foldover V8, V9
Poor horiz. linearity or foldover V10, V11, V12
Narrow picture V10, V11, V12, Rectifier (B+)
Vert. off freq. V8, V9
Horiz. off freq. V10

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster V1, V2, Diode (Video Det.), V3
No pic, no sound, has snow V201, V202
No pic, has sound, has raster V3, V14
Has pic, no sound V5, V6
Overloaded picture V4

SYNC FAILURE
No vert. sync V4, V7, V8
No horiz. sync V4, V7, V8
No vert. or horiz. sync V4, V7, V8

This receiver employs tubes used in a series filament network, an open filament in any tube will cause the set to be inoperative. (See circuit below.)



ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

Use an ISOLATION TRANSFORMER TO PROTECT the Test Equipment.
The high voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.
Suggested Alignment Tools: GENERAL CEMENT #8606, 8606L, 8282, 9295
WALSCO #2526, 2543, 2544, 2545

VIDEO IF ALIGNMENT

Connect the negative lead of a 7 volt bias supply to point (A). Positive to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	.01mfd	High side to pin 1 (grid) of 2nd Video IF. Low side to chassis. Adjust output for 4VP-P on scope.	44.0MC (10MC Swp)	42.4MC 45.75MC	Any non-interfering channel	Vert. Amp. thru 47K to point (B). Low side to chassis. (Across Video Det. load)	A1, A2	Adjust for maximum gain and symmetry of response similar to Fig. 1 with markers as shown. A1 controls marker position and A2 controls gain and symmetry.
2.	"	High side to pin 1 (grid) of 1st Video IF. Low side to chassis. Adjust for 4VP-P on scope.	"	42.4MC 43.5MC 44.5MC 45.75MC	"	"	A3, A4	Adjust for maximum gain and symmetry of response similar to Fig. 2 with markers as shown. A3 controls marker position and A4 controls gain and symmetry.
3.	Direct	Place a thin insulated metal strip between the Mixer-Osc. tube (V202), and tube shield. Connect the high side of sweep generator to the metal strip. Low side to chassis.	"	41.25MC 42.4MC 43.5MC 44.5MC 45.75MC	"	"	A5, A6, & Mixer Plate Coil	Adjust for maximum gain and symmetry of response similar to Fig. 3 with markers as shown. Adjust A5 to place 41.25MC marker in trap notch.

4.5MC TRAP ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
4.	.01mfd	High side to pin 2 (grid) of Video Output. Low side to chassis.	4.5MC (Unmod)	Any non-interfering channel	AC probe to pin 7 (cathode) of picture tube. Common to chassis. Use 0-10V AC scale.	A7	Adjust for MINIMUM deflection.

SOUND IF ALIGNMENT

Tune in a TV station and reduce the signal strength at the antenna terminals until a hiss is heard in the sound similar to super-regeneration.
Adjust A8, A9 and the Buzz control for maximum undistorted sound with MINIMUM buzz.
If the hiss disappears during adjusting, further reduce the signal strength.

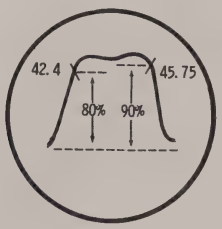


FIG.1

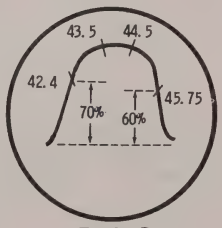


FIG.2

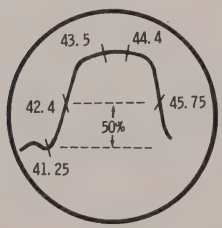
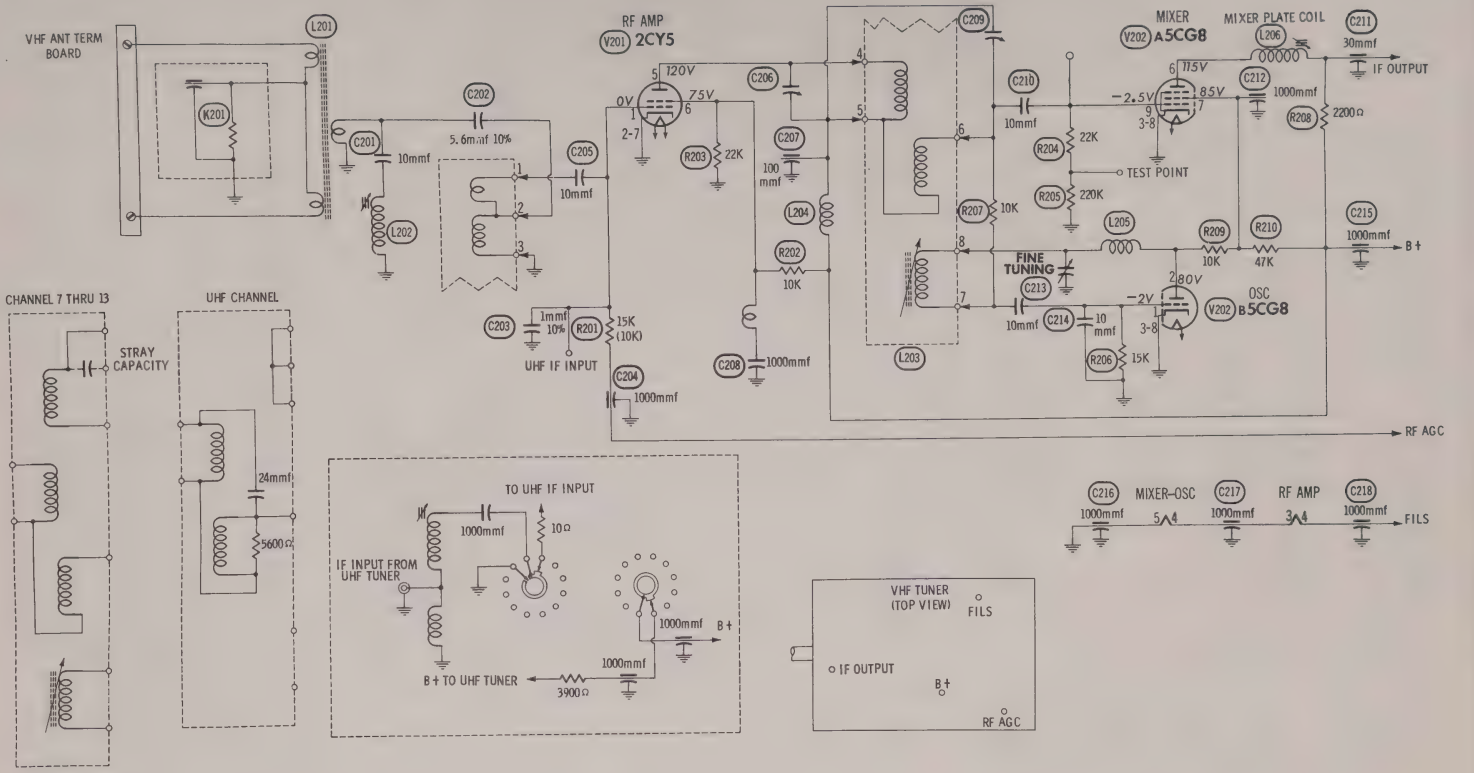


FIG.3



A PHOTOFACT STANDARD NOTATION SCHEMATIC

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VHF TUNER 25A1201 & UHF Provisions ADAPTER 2A523

AIRLINE MODELS
WG-4224A, WG-4324A
FOLDER 1

TUNER PARTS LIST AND DESCRIPTIONS

TUBES

• GENERAL ELECTRIC • RAYTHEON • SYLVANIA •					
ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V201	RF Amp.	2CY5	V202	Mixer-Osc.	5CG8

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C201	10		NPO-DI 10	DTZ-10	C10Q1C	CCTO-100	CNO-410	10TCC-Q10
C202	5.6 10%				C10V6C			10TCC-V56
C203	1 10%		NPO-SI 1.0	TCZ-1			CNO-510	10TCC-V10
C204	1000		EF-001	MFT-1000		CCF-102	CT280A	
C205	10		NPO-DI 10	DTZ-10	C10Q1C	CCTO-100	CNO-410	10TCC-Q10
C206								
C207	100		EF-0001	MFT-100				
C208	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C209								
C210	10		NPO-DI 10	DTZ-10	DTZ-10	CCTO-100	CNO-410	10TCC-Q10
C211	30							
C212	10000		EF-001	MFT-1000		CCF-102	CT280A	
C213	10		NPO-DI 10	DTZ-10	C10Q1C	CCTO-100	CNO-410	10TCC-Q10
C214	10		NPO-DI 10	DTZ-10	C10Q1C	CCTO-100	CNO-410	10TCC-Q10
C215	1000		EF-001	MFT-1000		CCF-102	CT280A	
C216	1000		EF-001	MFT-1000		CCF-102	CT280A	
C217	1000		EF-001	MFT-1000		CCF-102	CT280A	
C218	1000		EF-001	MFT-1000		CCF-102	CT280A	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REPLACEMENT DATA			ITEM No.	RATING	REPLACEMENT DATA		
		IRC PART No.	WORKMAN TV PART No.	REMARKS			IRC PART No.	WORKMAN TV PART No.	REMARKS
R201	15K			* (10K)	R206	15K			
R202	10K				R207	10K			
R203	22K				R208	2200Ω			
R204	22K				R209	10K			
R205	220K				R210	47K			

* Alternate Value

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	PART No.	REPLACEMENT DATA
K201	Antenna Filter		330-1 *	* Sarkes Tarzian Part Number

COILS (RF-IF)

ITEM No.	USE	PART No.	NOTES
L201	Antenna Trans.	3292-501	
L202	Trap Coil	2110-26	
L203A	Ant., RF, Mixer Grid, Osc. Coils	3262-507	Channel 2
B	"	3263-507	Channel 3
C	"	3264-507	Channel 4
D	"	3265-507	Channel 5
E	"	3266-507	Channel 6
F	"	3267-507	Channel 7
G	"	3268-507	Channel 8

ITEM No.	USE	PART No.	NOTES
L203H	Ant., RF, Mixer Grid, Osc. Coils	3269-507	Channel 9
I	"	3270-507	Channel 10
J	"	3271-507	Channel 11
K	"	3272-507	Channel 12
L	"	3273-507	Channel 13
L204	RF Choke	367-25	
L205	RF Choke	309-5	
L206	Mixer Plate Coil	2110-29	

Note: Part Numbers listed above are Sarkes Tarzian Part Numbers.

TUNER ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

Suggested Alignment Tools: GENERAL CEMENT #5009, 8195, 8274, 8275, 8728, 8729, 8987, 8988, 8989
WALSCO #2515, 2531, 2532

VHF OSCILLATOR ALIGNMENT

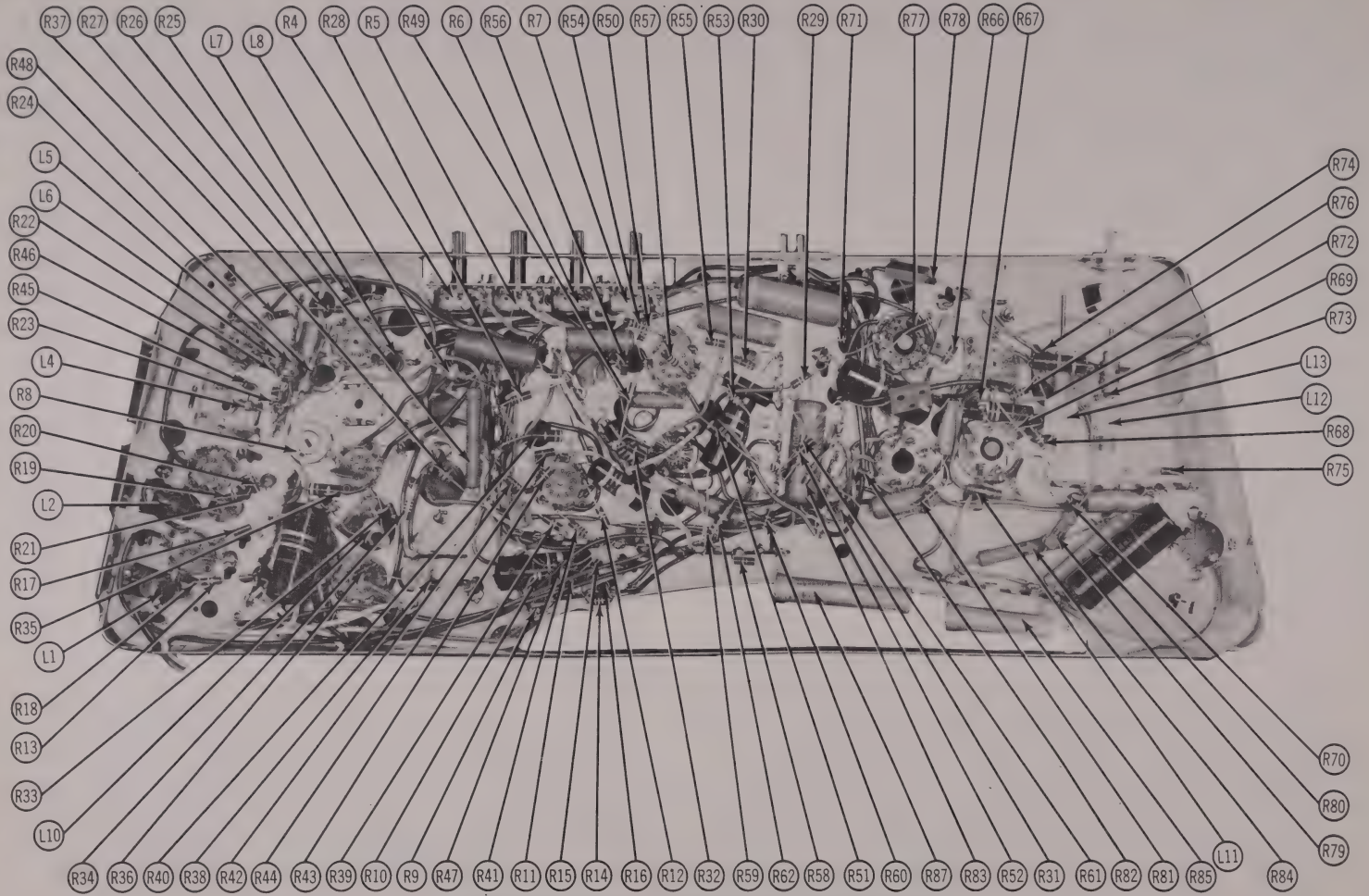
The individual channel adjustment screws are accessible one at a time, thru a hole in the front of the tuner, as the Channel Selector is rotated. Set the Fine Tuning to the center of its range and switch to channel to be adjusted and adjust for best picture and sound.

VHF RF AND MIXER ALIGNMENT

This portion of the tuner has been properly aligned at the factory and is very stable. Alignment of this portion should not be attempted in the field.

UHF TUNER ALIGNMENT

This portion of the tuner has been properly aligned at the factory and is very stable. Alignment of this portion should not be attempted in the field.



CHASSIS BOTTOM VIEW - RESISTOR & INDUCTOR IDENT.

PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No.	GENERAL ELECTRIC • RAYTHEON • SYLVANIA — USE	TYPE
V1	1st Video IF Amp.	3DK6
V2	2nd Video IF Amp.	3DK6
V3	Video Output	6BQ6
V4	AGC Keying - Sync Sep.	5BU8
V5	Audio Det.	3DK6
V6	Audio Output	6BQ5
V7	1st Sync Amp.	3AU6
V8	2nd Sync Amp. - Vert. Mult.	6CG7
V9	Vert. Mult. - Vert. Output	6EM5
V10	Horiz. AFC - Horiz. Osc.	6CG7
V11	Horiz. Output	12DQ8B
V12	Damper	17DE4
V13	HV Rectifier	1K3

PICTURE TUBE

ITEM No.	REPLACEMENT DATA: AIRLINE PART No.	GENERAL ELECTRIC PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	NOTES
V14	19XP4		19XP4 ①		19XP4 ③	① Aluminized ② Silver Screen "85"

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP.	VOLT.	REPLACEMENT DATA: AIRLINE PART No.	ARROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1	.140	150	45X418	AFB3S-33	EA2S8S	FP1U7	TMS-1270	TVL-1438	
C2A	.4125	300	45X478 ①	AFB3S-99-80	D0830	FP32S.7S	TMQ-4277	TVL-3574.5	
B	▲20	300							
C	▲ 50	50							
C3A	.4125	300	45X467	AFB3-99-82	D0046	FP330.27	TMT-3310	TVL-3574.6*	
B	▲60	300							

① Some versions may use Part #45X488.
* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA: ARROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	FLAMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C4	.47 200V		7288N-47		CUB2P47	2DP-S-474	GEM-4047	2TM-P47
C5	1000		BPD-001		DD-102	BYA10X	CCD-102	5HK-D10
C6	68 NPO	† (56)	NPO-DI 68	DTZ-68	C0G68C	CCTO-680	CNO-468	10TCC-Q68
C7	270 10%		DI-270	DD-271	L07Z7	CCD-271	GF927	10TS-T27
C8	1000		BPD-001	DD-102	BYA10X	CCD-102	B-X10	5HK-D10
C9	.47 200V		7288N-47		CUB2P47	2DP-S-474	GEM-4047	2TM-P47
C10	390 10%		DI-390	DD-391	L07Z9	CCD-391	GF939	10TS-T39
C11	470 10%	† (330)	DI-470	DD-471	S8S7Z	CCD-471	GF947	10TS-T47
C12	1000		BPD-001	DD-102	BYA10X	CCD-102	B-X10	5HK-D10
C13	1000 10%		DI-1000	DD-102	PM8D1	CCD-102	GF10	10TS-D10
C14	.047 200V		7288N-047	DD-473	CUB2S47	4DP-3-473	GEM-4147	2TM-S47
C15	30 N33 10%	#47X689				*		
C16	1 400V		2488N-1	DF-104	CU84P1	4DP-3-104	GEM-401	4TM-P10
C17	1000 10%		DI-1000	DD-102	S8S0i	CCD-102	GF10	10TS-D10
C18	.047 1000V		PD68N-047		1ED2P-S-473	GEM-4047	10TM-S47	
C19	5000		BPD-005	DD-502	BYA10D6	CCD-502	B-X50	5HK-D50
C20	1000 1400V		HVD15-1000	DD50-102	HVB16Z6	3CCD-102	2HV-X10	BL-D10
C21	3.3 10%		HPO-EI 3.3	TCZ-3R3	CUV3C	CCTO-3R3	CNO-533	10TCC-V33
C22	680 10%		DI-680	DD-681	S8S7Y6	CCD-681	GF988	10TS-T68
C23	15 N220 10%	#47X672				*		10TCH-Q15
C34A	1000		BPD-2X001	DD3-102	BYD6DD1	CCD-102	B2X10	5HK-2X10
B	1000					CCD-102		
C35	5000		BPD-005	DD-502	BYA10D6	CCD-502	B-X50	5HK-D50
C36	5000		BPD-005	DD-502	BYA10D6	CCD-502	B-X50	5HK-D50
C37	.0047 600V		2488N-0047	DE-472	CUB1D47	6DP-1-472	GEM-6347	6TM-P47
C38	5000		BPD-005	DD-502	BYA10D6	CCD-502	B-X50	5HK-D50
C39	.047 400V		2488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C40	.047 400V		2488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C41	.0039 400V		2684CM-0039	DD-392	DPM6D39	6DP-1-392	GP239	6PS-D39
C42	.01 400V		2488N-01	DE-103	CU84S	4DP-1-103	GEM-411	4TM-S10
C43	470 10%		DI-470	DD-471	S8S7Z47	CCD-471	GF347	10TS-T47
C44	.047 600V		2688N-047	DD-503	CUB6S47	6DP-3-473	GEM-6147	6TM-S47
C45	.15 200V 10%		V84C2P15-10%		PME2P15	2DP-3-154	GEM-2015	2TM-P15
C46	.033 200V 10%		V84C2S33-10%		PME2S33	4DP-2-333	GEM-4133	6TM-S33
C47	1000 10%		BPD-001	DD-102	PM8D1	CCD-102	GF10	10TS-D10
C48	.01 600V		2688N-01	DE-103	CU86S	6DP-2-103	GEM-611	6TM-S10
C49	18 10%	1469-000018	1469-000018	TCZ-18	22RSQ18	CM-19B-180K	CNO-418	MS-418
C50	82 10%		1469-000082	TCZ-82	22RSQ82	CM-19B-820K	CNO-482	MS-482
C51	100 10%		1469-0001	TCZ-100	22RST1	CM-19B-101K	MCB235	MS-S1
C52	.047 200V		2288N-047	DD-503	CUB2S47	4DP-3-473	GEM-4147	2TM-S47
C53	.022 200V		2288N-022	DD-203	CUB4S22	4DP-2-223	GEM-4122	2TM-S22
C54	.47 200V		2288N-47		CUB2P47	2DP-S-474	GEM-2047	2TM-P47
C55	220 10%		1469-00022	TCZ-220	22RST22	CM-19B-221K	CNO-322	MS-322
C56	.01 600V		2688N-01	DE-103	CU84S	4DP-1-103	GEM-611	4TM-S10
C57	82 10%		1469-00082		CUB2T82	CM-19B-820K	MCB251	MS-382
C48	170-700	#47A278				481		
C49	1000		BPD-001	DD-102	BYA10X	CCD-102	B-X10	5HK-D10
C50	.047 400V		2488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C51	.22 600V		2688N-22		CUB6P22	6DP-S-224	GEM-6022	6TM-P22
C52	120 5000V N1500 5%							
C53	.033 600V		P688N-033	DD-303	CUB6S33	6DP-3-333	GEM-6133	6TM-S33
C54A	1000		BPD-2X001	DD3-102	BYD6DD1	CCD-102	B2X10	5HK-2X10
B	1000					CCD-102		
C55	.22 400V		2488N-22		CU84P22	4DP-S-224	GEM-4022	4TM-P22
C56	1000		BPD-001	DD-102	BYA10X	CCD-102	B-X10	5HK-D10

† Alternate Value. # Airline Part Number.
* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

CONTROLS

ITEM No.	RATING: RESISTANCE	WATTS	REPLACEMENT DATA: AIRLINE PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1000Ω	½	78X39	F1-4	RPL-57 *	XTV-T25	■ U6420S-S	Contrast
B	1meg	½		RPL-57 *	Not Reg.			Volume
C	Switch							Push-Pull Off-On

CONTROLS (cont)

ITEM No.	RATING: RESISTANCE	WATTS	REPLACEMENT DATA: AIRLINE PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R3A	500K	½	40X490	AB-59	A47-500K-S	BU-133	U59	Brightness
B	Shaft			AK-33	RS-3/16	SK9	U6-37	
R3A	1meg	½	40X489	AB-69	A47-1meg-S	BU-137	U54	Vert. Hold
B	Shaft			AK-33	RS-3/16	SK9	U6-37	
R4	2.5meg	½	40X468-1	TT-83	B47-2.5meg-S	HLC3	SU-565	Sync Stabilizer
R5	2.5meg	½	40X468-1	TT-83	B47-2.5meg-S	HLC3	SU-565	AGC
R6	2.5meg	½	40X468-1	TT-83	B47-2.5meg-S	HLC3	SU-565	Height
R7A	50K	½	40X487-1	TT-3K	B47-50K-S	BU-133	PTA84L	Vert. Linearity Note 1
B	Shaft			Not Reg.	Not Reg.	T344	N4 Reg	
R8	500Ω	20W)	40X472			110-600	PFL-500	Buzz Control

* Do not use Tap. ■ "STA-LOC" Equivalent: FA13L, RUP16L, OF1625.
Note 1. Some versions may use 150K (Pt. #40X493-1) for R7. R5S & R5S not used with this application.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise specified.

ITEM No.	RATING	REPLACEMENT DATA: IRC PART No.	WORKMAN TV PART No.	REMARKS
R9	390K			
R10	3.9meg			
R11	560K			
R12	100K			
R13	10K			
R14	330K			
R15	220K			
R16	180K			
R17	470Ω			
R18	56Ω			
R19	22K			
R20	470Ω			
R21	150Ω			
R22	4700Ω			
R23	47K			
R24	1.5meg			
R25	1meg			
R26	3600Ω 4W	PW5-3600Ω	4G-3600Ω	#43X331
R27	68Ω			
R28	180K			
R29	180K			
R30	8.5meg			
R31	20meg			
R32	100K			
R33	82K			
R34	330K			
R35	4700Ω 1W			
R36	100Ω			
R37	330Ω 1W			
R38	150Ω			
R39	100K			
R40	3600Ω 1W			
R41	33K			
R42	56K			
R43	82K			
R44	2.2meg			
R45	10K			
R46	6800Ω			
R47	10K			
R48	6800Ω			

ITEM No.	RATING	REPLACEMENT DATA: IRC PART No.	WORKMAN TV PART No.	REMARKS
R49	1meg			
R50	47K			
R51	6800Ω 1W			
R52	3300Ω			
R53	330K			
R54	470K			
R55	82K ▲			
R56	22K ▲			
R57	330K			
R58	56K			
R59	56K			
R60	39K			
R61	47K			
R62	470Ω 1W			
R63	220Ω			
R64	220Ω			
R65	3.0Ω (Cold)			
R66	220K			
R67	330K			
R68	820K			
R69	82K			
R70	330K			
R71	3900Ω			
R72	82K			
R73	22K			
R74	10K			
R75	1meg			
R76	56K			
R77	68Ω			
R78	1meg			
R79	22K 2W			
R80	33K 5W	PW5-33K	5G-33K	#43X356
R81	5600Ω			
R82	100K			
R83	100K			
R84	10K 10W	PW10-10K	10G-10K	#43X334
R85	1700Ω 15W			#43X334
R86	7.5Ω 15W †	FR-7.5Ω	F80	#43X397
R87	36Ω 30W			#43X315

Airline Part Number
* Alternate Value

▲ Not used when 150K Vert. Linearity Control is used.
† Fusible Type

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	AIRLINE PART No.	REPLACEMENT DATA
K1	Vert. Integrator	2000mmf, 100K, 100K	76X19	
K2	Isolation	470mmf, .3-1meg	76X18	Centralab RC-47I Sprague ACI-1

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA: AIRLINE PART No.	Merit PART No.	Stancor PART No.	Workman TV PART No.	NOTES
L1A	1st Video IF	9A2436		TV-156		① Includes Complete Assy.
B	41.25MC Trap					② Alternate Part 9A2432.
L2	2nd Video IF	9A2444				③ Wound on 220Ω Res.
L3A	3rd Video IF	9A2483 ①				④ Wound on 22Ω Resistor
B	RF Choke					⑤ Wound on 6800Ω Res.
L4	Peaking (30uh)	9A2375 ②	TV-180	6178	RTC-8593	T308	* Parallel with 2200Ω Res.
L5	Peaking (240uh)	36A50 ③	TV-185 *	6181 *	RTC-8590 *	T315 *	▲ Parallel with 220Ω Res.
L6	Peaking (110uh)	36A19 ④	TV-182 ▲	6153 ▲	RTC-8585 ▲	T307 ▲	■ Parallel with 6800Ω Res.
L7	4.5MC Trap	9A2368	TV-151	1469	RTC-8603	T250	
L8	Peaking (190uh)	36A44 ⑤	TV-197 ▲	6154 ▲	RTC-8586 ▲	T312 ▲	
L9	Sound Takeoff	9A2434	TV-154	1470-A	RTC-8604	T247	
L10	Quadrature	9A2367	TV-131	1480	RTC-8605	T251	
L11	RF Choke (1.5uh)	9A2380	BC-562	4804	RTC-8516	T856	

COILS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA: AIRLINE PART No.	Merit PART No.	*Miller PART No.	Rogers PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	Workman TV PART No.
L22	Horiz. Osc.	9A2481							
L23	Horiz. Waveform	9A2372	MWC-12	6315	QRC104	RTC-8628	HS-8	WLC-3	T110

FILTER CHOKE

ITEM No.	RATINGS: CURRENT (Measured)	DC RES.	INDUCTANCE @ CURRENT 1000 (%)	REPLACEMENT DATA: AIRLINE PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
L24	.300A	45Ω	1 Hy.	52X1042		C-2343 ①	28C44	C-38X	① Drill new mounting hole.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA: AIRLINE PART No.	Merit PART No.	Rogers PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	Vert. Output	51X191-2						
T2	Yoke (Horiz. 15.6MH) 100% (Vert. 14MH)	9A2477 ①		PCM-2017 ②③④	DY-37A ②③④		Y-53 ③	Y-60 & NW23 ③
	Alt. Yoke	9A2477						
	Yoke Clamp	30X828						
T3	Horiz. Output	53X390						

① Includes rear cover and centering device.
② Connect same as original.
③ Requires new rear cover and centering device.
④ Use original yoke damping network.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI.	SEC.	REPLACEMENT DATA: AIRLINE PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T4	8000Ω	3-4Ω	51X206A ①	A-3026	A-3877 ②	24S48	S-49X ②	① Alternate Part #51X206 ② Drill new mounting hole.

SPEAKER

ITEM No.	TYPE: SIZE	FIELD V. C. IMP.	REPLACEMENT DATA: AIRLINE PART No.	QUAM PART No.	NOTES
SP1	4"	PM 3-4Ω	12AS90	4A07	

POWER RECTIFIERS

ITEM No.	RATING: CURRENT (Measured)	REPLACEMENT DATA: AIRLINE PART No.	RCA PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	NOTES
M1	.300A	66X23	1N1763	40H	SR500	
M2	.500A	66X23	1N1763	40H	SR500	

SIGNAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA: AIRLINE PART No.	GENERAL ELECTRIC PART No.	RAYTHEON PART No.	SYLVANIA PART No.	NOTES
M3	1N60 †	66X20		1N60	1N60	Crystal Diode, Video Det., Pigtail † Alternates 1N87, 1N87A, CK-706A

MISCELLANEOUS

ITEM No.	PART NAME	AIRLINE PART No.	NOTES
M4	Tuner	21A1201	VHF, STANDARD COIL REPLACEMENT #GCS-4221A
	Tuner	21A1277	UHF
M5	Antenna	43A679	4FD REPLACEMENT #TA-409
	Switch	2A523	(UHF Provisions Adapter)

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

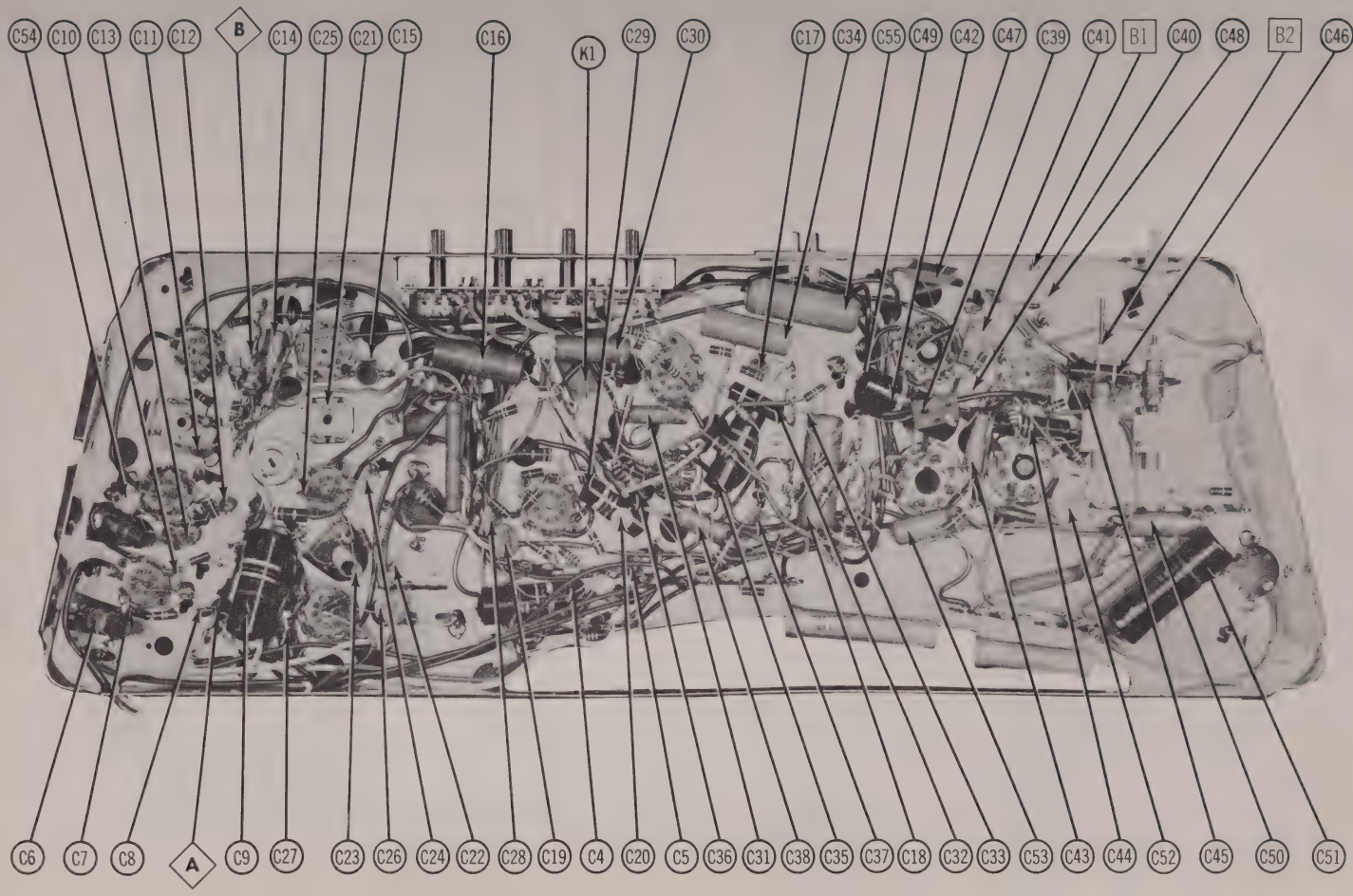
NAME	PART NO.	DESCRIPTION
Safety Glass	26A704	
Mask	43X577-2	
Dial	58X834	VHF Channel Indicator
Knob	10A1017	UHF Channel Indicator, Model WG-4334A Only
Knob	10A1013	VHF Channel Selector
Knob	10A1016	UHF Channel Selector, Model WG-4324A Only
Knob	10A1013	Fine Tuning
Knob	10A1014	Contrast
Knob	10A581-4	Brightness
Knob	10A1015	Volume
Knob	10A581-4	Vertical Hold
Knob	10A1018-2	Horizontal Hold
Knob	10A1018-4	Range (AGC)
Cabinet	34X62-1	

WIRING DATA

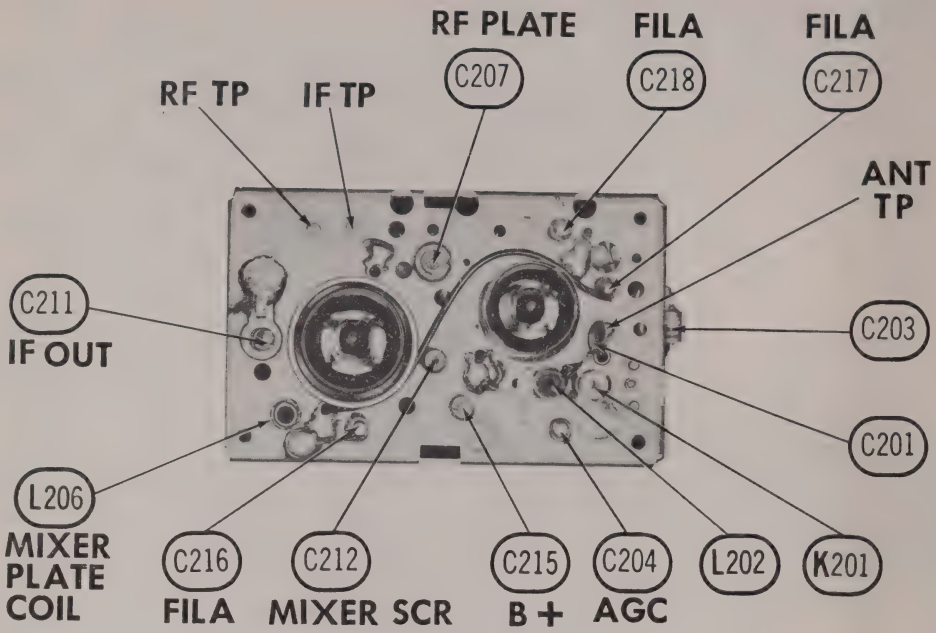
High Voltage Lead	Use BELDEN No. [illegible]
Shielded Hook-up Wire	Use BELDEN No. 8885 (Single Conductor) 8738 (Two Conductor)
General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8534 (Stranded) Available in Ten Colors
Power Cord (Interlock Type)	Use BELDEN No. 8874
300Ω Tuner Input Lead	Use BELDEN No. 8225
300Ω Antenna Lead-in	Use BELDEN No. 8230 or 8275
Antenna Rotor Cable	Use BELDEN No. 8486 (Flat) or 8484 (Round) - 4 Conductor 8485 (Round) - 5 Conductor 8488 (Round) - 8 Conductor

AIRLINE MODELS WG-4324A, WG-4334A

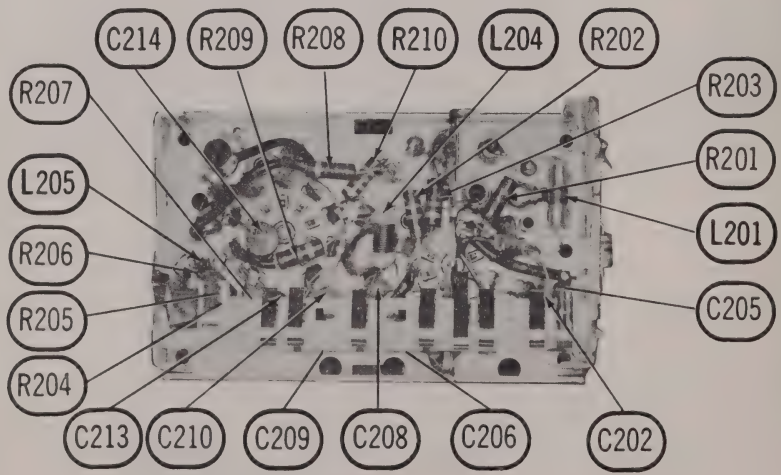
FOLDER 1



CHASSIS BOTTOM VIEW - CAPACITOR & MISC. IDENT.

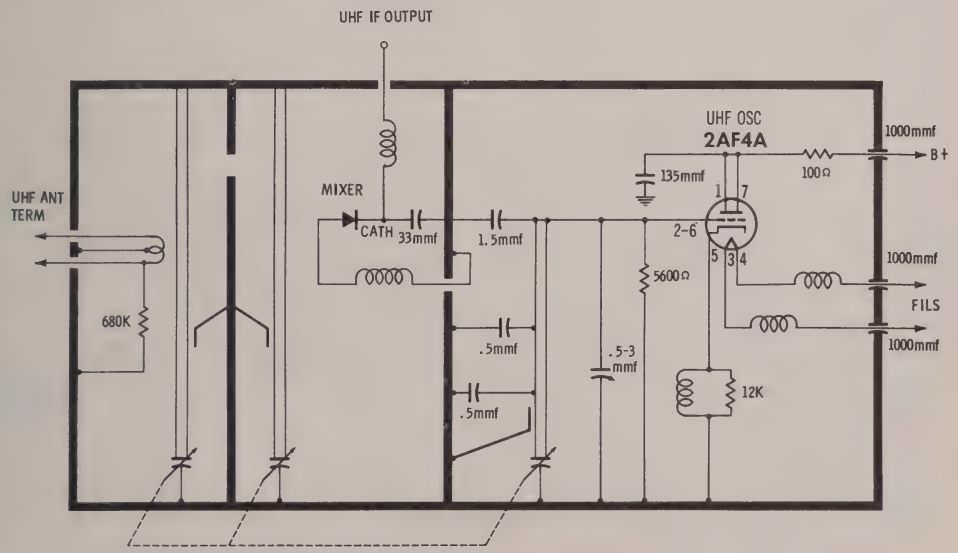


VHF TUNER with UHF Provisions 25A1201 - TOP VIEW



VHF TUNER with UHF Provisions 25A1201 - BOTTOM VIEW

CHASSIS - TOP VIEW



A PHOTOFACT STANDARD NOTATION SCHEMATIC

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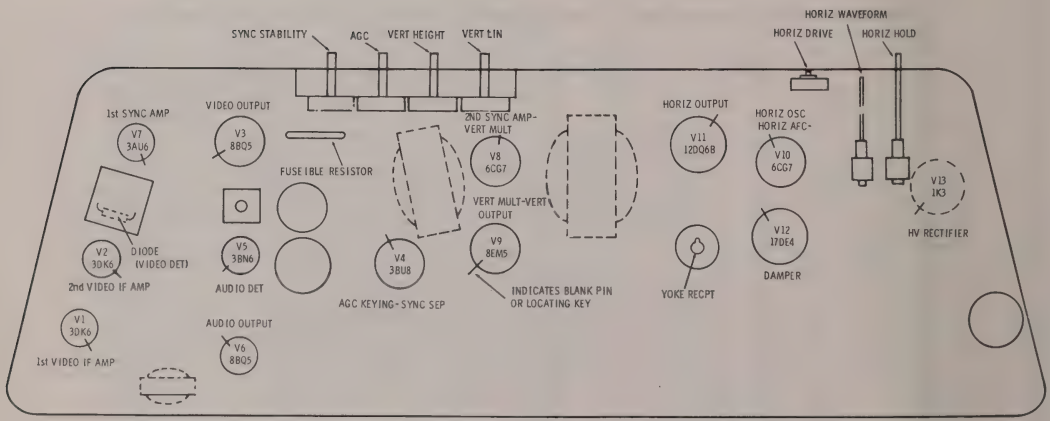
UHF TUNER 25A1207

RESISTANCE MEASUREMENTS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	3DK6	460K	56Ω	46Ω	44Ω	†2100Ω	†2100Ω	0Ω		
V2	3DK6	0Ω	150Ω	44Ω	42Ω	†2100Ω	†2100Ω	0Ω		
V3	8BQ5	NC	700K	• 350Ω	60Ω	51Ω	NC	†3600Ω	NC	†1700Ω
V4	3BU8	†1700Ω	†6800Ω	450K	37Ω	35Ω	†40K	• †500K	†30K	†2.2meg
V5	3BN6	• 300Ω	6Ω	39Ω	37Ω	†6400Ω	4.8Ω	†330K		
V6	8BQ5	NC	• 100Ω	150Ω	51Ω	46Ω	NC	†740Ω	NC	†375Ω
V7	3AU6	5000Ω	†8500Ω	42Ω	39Ω	†8500Ω	†8500Ω	0Ω		
V8	6CG7	• ‡ 1meg	• 520K	0Ω	64Ω	60Ω	†12K	47K	0Ω	0Ω
V9	8EM5	†45Ω	NC	330K	64Ω	70Ω	NC	470Ω	NC	†480Ω
V10	6CG7	†56K	410K	0Ω	24Ω	20Ω	†45Ω	1.5meg	410K	0Ω
V11	12DQ6B	NC	35Ω	TP	†22K	1meg	TP	28Ω	0Ω	TOP CAP †16Ω
V12	17DE4	TP	NC	†30K	NC	†45Ω	TP	4Ω	20Ω	
V13	1K3		PINS	1 THRU 8	HAVE	INFINITE	RESISTANCE			TOP CAP †315Ω
V14	19XP4	24Ω	180K	‡ 10meg	†100K	NC	NC	• 300K	28Ω	
V201	2CY5	1.2meg	0Ω	3Ω	4Ω	†1700Ω	†9500Ω	0Ω		
V202	5CG8	15K	†10K	0Ω	3Ω	0Ω	†4000Ω	†16K	0Ω	240K
ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9

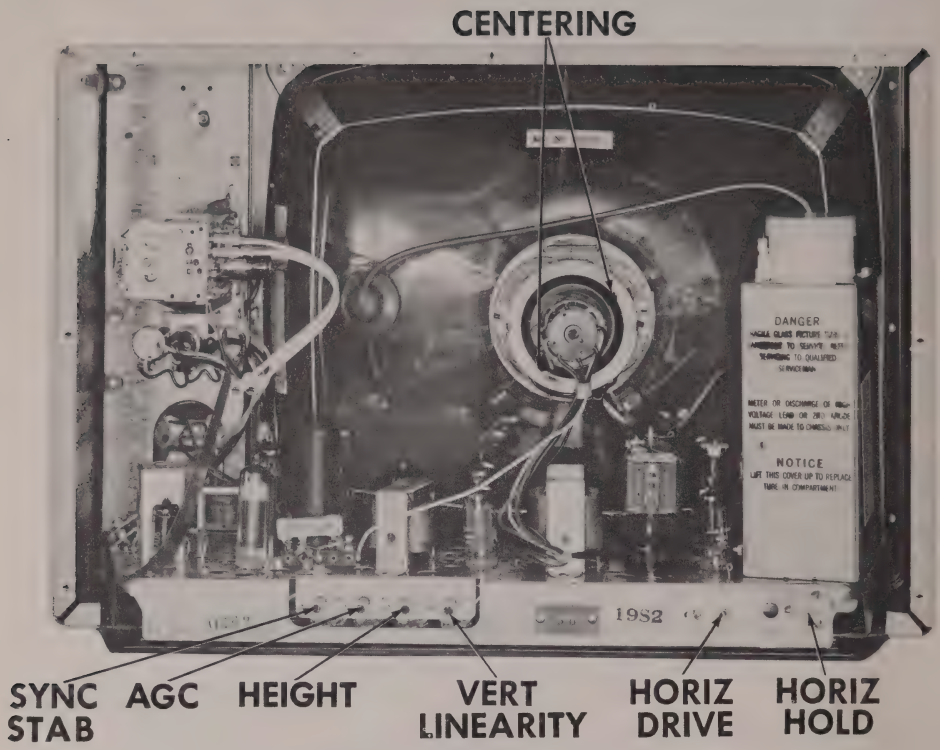
• THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.
† MEASURED FROM OUTPUT OF M1.
‡ MEASURED FROM PIN 3 OF V12.

NC NO CONNECTION
TP TIE POINT



BOTTOM VIEW

TUBE PLACEMENT CHART



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Suggested Alignment Tools:
B1 ... GENERAL CEMENT #5000, 5003, 5066, 8276, 8290, 9087, 9089
WALSCO #2512, 2525, 2528
B2 ... GENERAL CEMENT #8282, 8606, 8606L, 9295, 9440
WALSCO #2526, 2543, 2544, 2545

Turn set on and tune in a TV station. Adjust Horiz. Hold (Freq. Slug) until picture synchronizes horizontally.

Turn the Contrast Control fully counterclockwise and the Brightness Control clockwise so that the picture appears washed out. Turn the Horizontal Drive Trimmer (B1) clockwise until white vertical bars (drive lines) appear in the left center portion of the raster, then counterclockwise until the white bars just disappear.

Connect the Vertical Amplifier of the scope to point Ⓒ. Low side to chassis. Adjust the Horizontal Waveform Slug (B2) until the round and sharp peaks of the waveform are equal in amplitude. See Fig. 4. Keep the picture in sync during this adjustment.

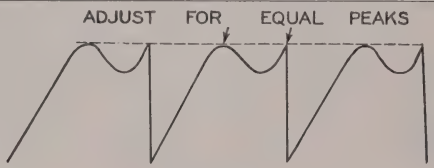


FIG. 4

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL MODEL WG-4224A

1. Remove 7 metal screws holding rear cover.
2. Remove rear cover.
3. Remove 6 push-on type knobs from front of cabinet.
4. Remove 4 screws holding front panel over knobs.
5. Remove picture tube socket, yoke plug, high voltage lead, speaker leads, and ground wire from picture tube mounting to chassis.
6. Remove 4 screws holding tuner and control panel assembly.
7. Remove chassis bolts.
8. Remove chassis.

PICTURE TUBE REMOVAL

It is necessary to remove the chassis for picture tube removal.

PHOTOFACT® Folder

MOTOROLA MODELS
19P1-1, 19P1-2 (CH. TS-432)

IMPORTANT FILING NOTICE

The TV Folder for this envelope will be found among the first folders in this complete Set of folders.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.

MOTOROLA MODELS
19P1-1, 19P1-2 (CH. TS-432)

MODEL 19P1-1 (CH. TS-432A-11)

MOTOROLA MODELS
19P1-1, 19P1-2 (CH. TS-432)

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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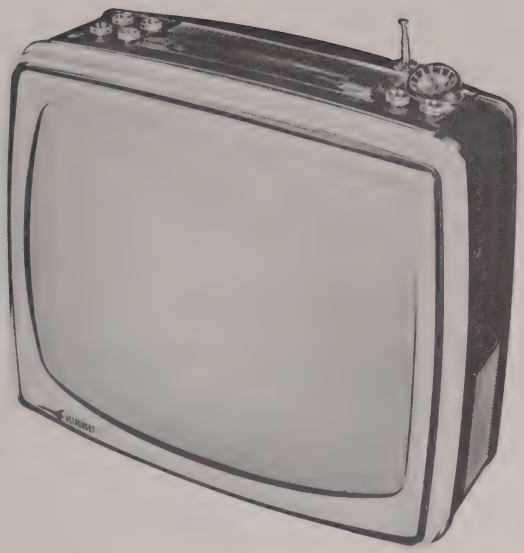
SET 520 FOLDER 2

PHOTOFACT® Folder

MOTOROLA MODELS 19P1-1, 19P1-2 (CH. TS-432)

MOTOROLA MODELS 19P1-1, 19P1-2 (CH. TS-432)



MODEL 19P1-1 (CH. TS-432A-11)

MOTOROLA MODELS 19P1-1, 19P1-2 (CH. TS-432)

TRADE NAME	Motorola, Model 19P1-1, 19P1-2 (Chassis TS-432A-11, TS-432C-00)
MANUFACTURER	Motorola Inc., 4545 W. Augusta Blvd., Chicago 51, Illinois
TYPE SET	Portable Television Receiver
TRANSISTORS	Twenty-Five
TUBES	Two (Hi Volt. Rect. & Picture Tube)
POWER SUPPLY	105-130 Volts AC, 60 Cycle (or) 18V (22.1-22.6 fully charged) Battery
RATING	47 Watts, .5 Amp. @ 117 Volts AC (or) 1.5 Amp. @ 18 Volts DC
TUNING RANGE	Channels 2 thru 13 VHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

SERVICING IN THE FIELD

SAFETY GLASS REMOVAL

Lift handle and remove 2 screws holding top plate. Remove 2 screws, now visible, holding front bezel. Remove 2 screws at bottom of cabinet (holding bezel) and remove bezel.

FUSE

A 3/4 Amp. (S/B) line fuse (on AC Operation) and a 3 Amp. fuse (on Battery Operation) is used for LV Supply protection. (See "Tube Placement Chart" for location.)

TUNER OSCILLATOR ADJUSTMENT

To touch up the VHF Oscillator, it is necessary to remove knobs and escutcheon.

AGC

The AGC may be varied by means of an AGC Control. First adjust Range Switch to area of operation-Fringe-Suburban-Local. (For location, see "Tube Placement Chart".)

FOCUS

The focus may be varied on some chassis by connecting the lead from pin 4 of the picture tube to various voltage points. (See "TV Schematic).

WIDTH

Adjust high voltage transformer secondary core (using adj. bolt) for correct width and high voltage.

CENTERING

Centering is accomplished by 2 magnetic rings, located behind the yoke, on the neck of the picture tube.

FOR BIAS & MISC. ADJUSTMENTS SEE PAGE 3

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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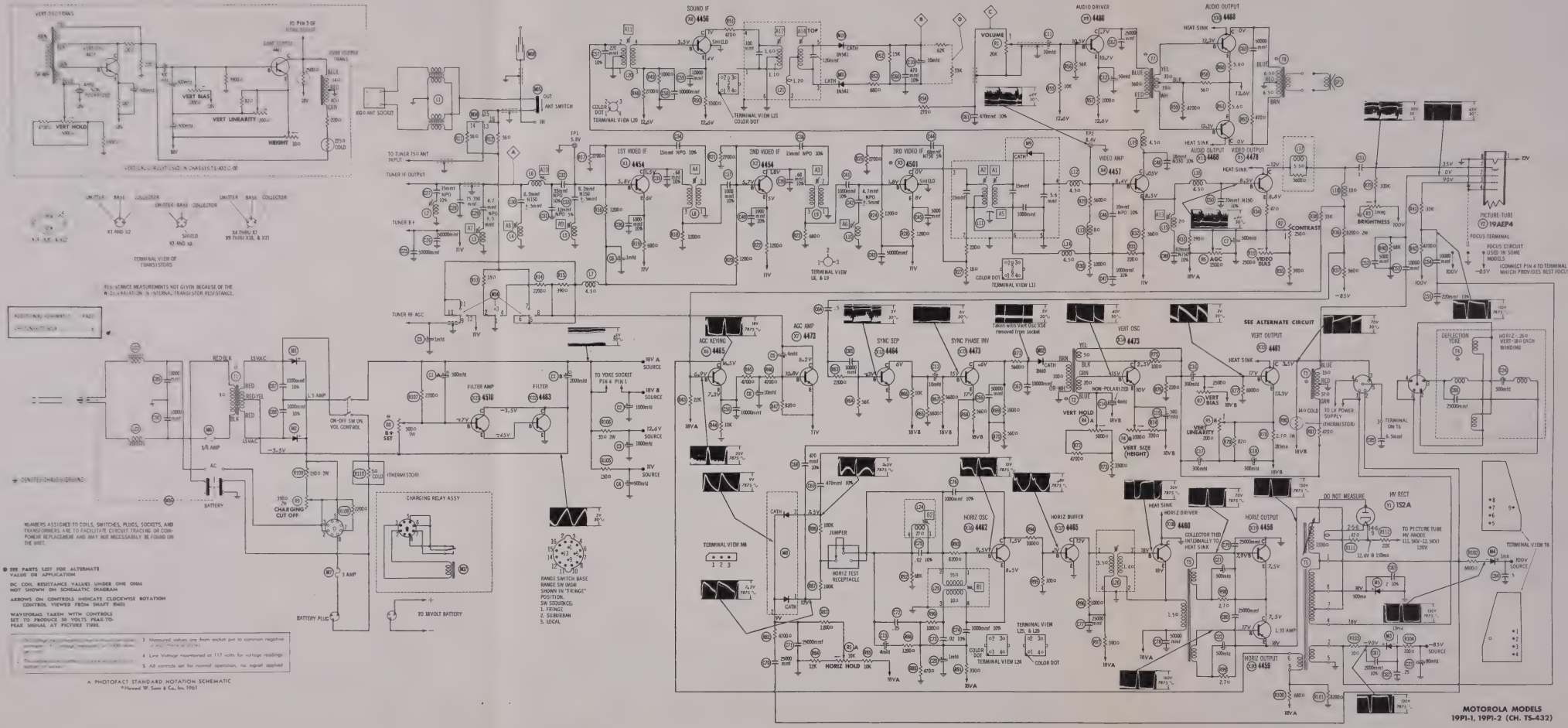
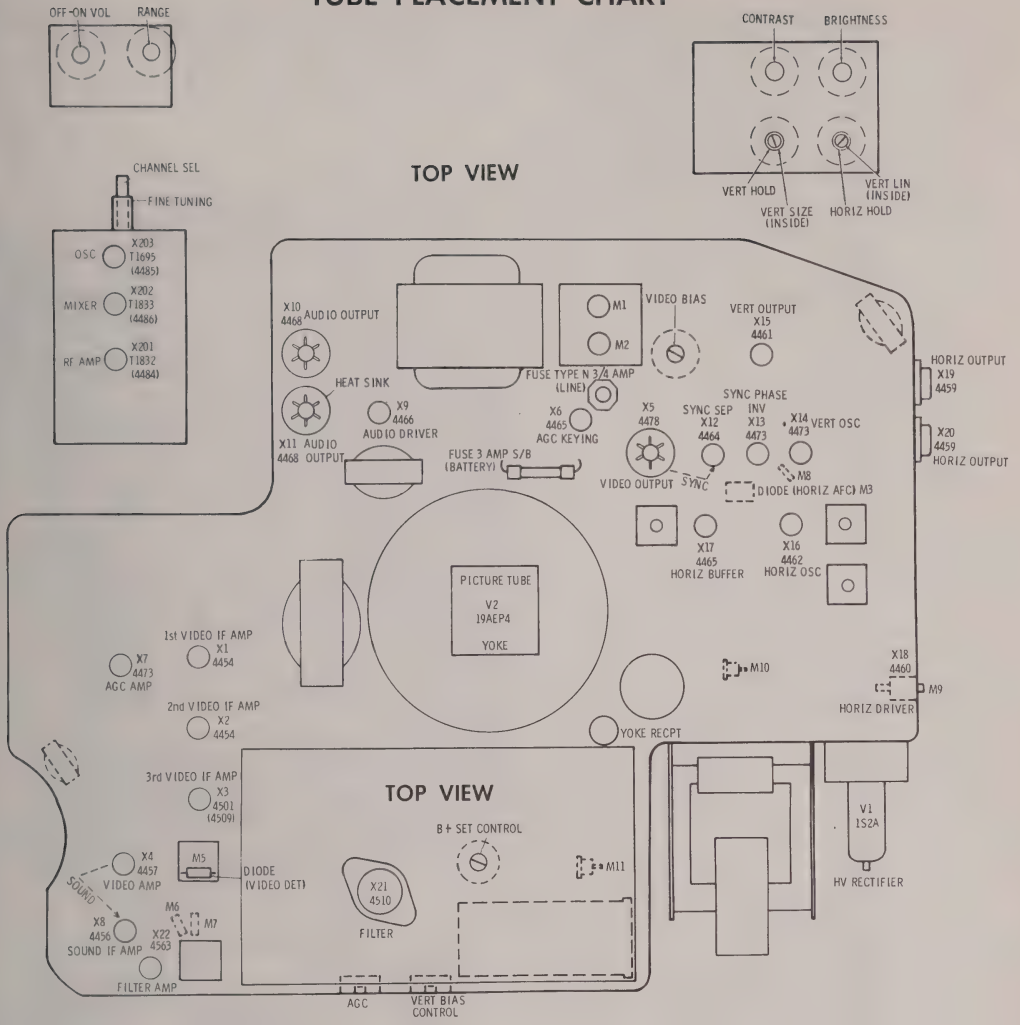
KA477

SET 520 FOLDER 2


VERT OSC TRANS
TO PIN 7 OF
VERT BIAS
VERT LINEARITY
HEIGHT
VERT HOLD
FLYBACK TRANS
SOUND IF
AUDIO DRIVER
AUDIO OUTPUT
VOLUME
ANT SWITCH
TO TUNER 75Ω ANT INPUT
TUNER IF OUTPUT
TUNER B+
TUNER RF AGC
1ST VIDEO IF
2ND VIDEO IF
3RD VIDEO IF
VIDEO AMP
VIDEO OUTPUT
BRIGHTNESS
CONTRAST
AGC
VIDEO BIAS
PICTURE TUBE
19AEP4
FOCUS-TERMINAL
FOCUS CIRCUIT USED IN SOME MODELS
(CONNECT PIN 4 TO TERMINAL WHICH PROVIDES BEST FOCUS)
TERMINAL VIEW OF TRANSISTORS
RESISTANCE MEASUREMENTS NOT GIVEN BECAUSE OF THE DEGRADATION IN INTERNAL TRANSISTOR RESISTANCE.
ADDITIONAL SCHEMATIC PAGE
CONTINUED ON PAGE
AGC KEYING
AGC AMP
SYNC SEP
SYNC PHASE INV
VERT OSC
VERT OUTPUT
SEE ALTERNATE CIRCUIT
VERT HOLD
VERT SIZE (HEIGHT)
VERT LINEARITY
DEFLECTION YOKE
HORIZ. 25Ω VERT. 18Ω EACH WINDING
TO LV POWER SUPPLY
TERMINAL ON T6
FILTER AMP
FILTER
ON-OFF SW ON VOL CONTROL
TO YOKE SOCKET PIN 6 PIN 1
18V A SOURCE
18V B SOURCE
12.6V SOURCE
11V SOURCE
8.5V SOURCE
SET
THERMISTOR
CHARGING CUT OFF
CHARGING RELAY ASSY
TO 18VOLT BATTERY
BATTERY PLUG
AC
BATTERY
15VAC
RED-BLK
RED-YEL
RED
BLK
1/8 AMP
1.5 AMP
3 AMP
-3.5V
-7.2V
-7.45V
HORIZ OSC
HORIZ BUFFER
HORIZ DRIVER
HORIZ OUTPUT
HORIZ TEST RECEPTACLE
HORIZ HOLD
JUMPER
TERMINAL VIEW M8
TERMINAL VIEW L2, L3, L4
TERMINAL VIEW L5 COLOR DOT
TERMINAL VIEW L8, & L9
TERMINAL VIEW L11
TERMINAL VIEW L12
TERMINAL VIEW T6
RANGE SWITCH BASE
RANGE SW (#S) SHOWN IN "FRINGE" POSITION.
SW SEQUENCE:
1. FRINGE
2. SUBURBAN
3. LOCAL
DO NOT MEASURE
HV RECT
V1 1S2A
TO PICTURE TUBE HV ANODE
111.5KV-12.5KV
120V
12.6V @ 150mA
NON-POLARIZED
CRT-WH
CRT-BRN
NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.
SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION CONTROL VIEWED FROM SHAFT END.
WAVEFORMS TAKEN WITH CONTROLS SET TO PRODUCE 30 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE.
3 Measured values are from socket pin to common negative
4 Line Voltage maintained at 117 volts for voltage readings
5 All controls set for normal operation, no signal applied
A PHOTOFACT STANDARD NOTATION SCHEMATIC
©Howard W. Sams & Co., Inc. 1961
MOTOROLA MODELS
19P1-1, 19P1-2 (CH. TS-432)

TRANSISTOR & TUBE PLACEMENT CHART



MISCELLANEOUS ADJUSTMENTS

VERTICAL BIAS

To adjust the Vertical Bias control, turn the Vertical Size control to reduce the size of the raster to 1 inch below the top of screen. Turn the Vertical Bias control fully counterclockwise (when viewed from bottom of chassis), then slowly turn clockwise until compression of the upper portion on the raster is noted, then back off slightly. Adjust the Vertical Size and Linearity controls for desired raster size.

VIDEO BIAS

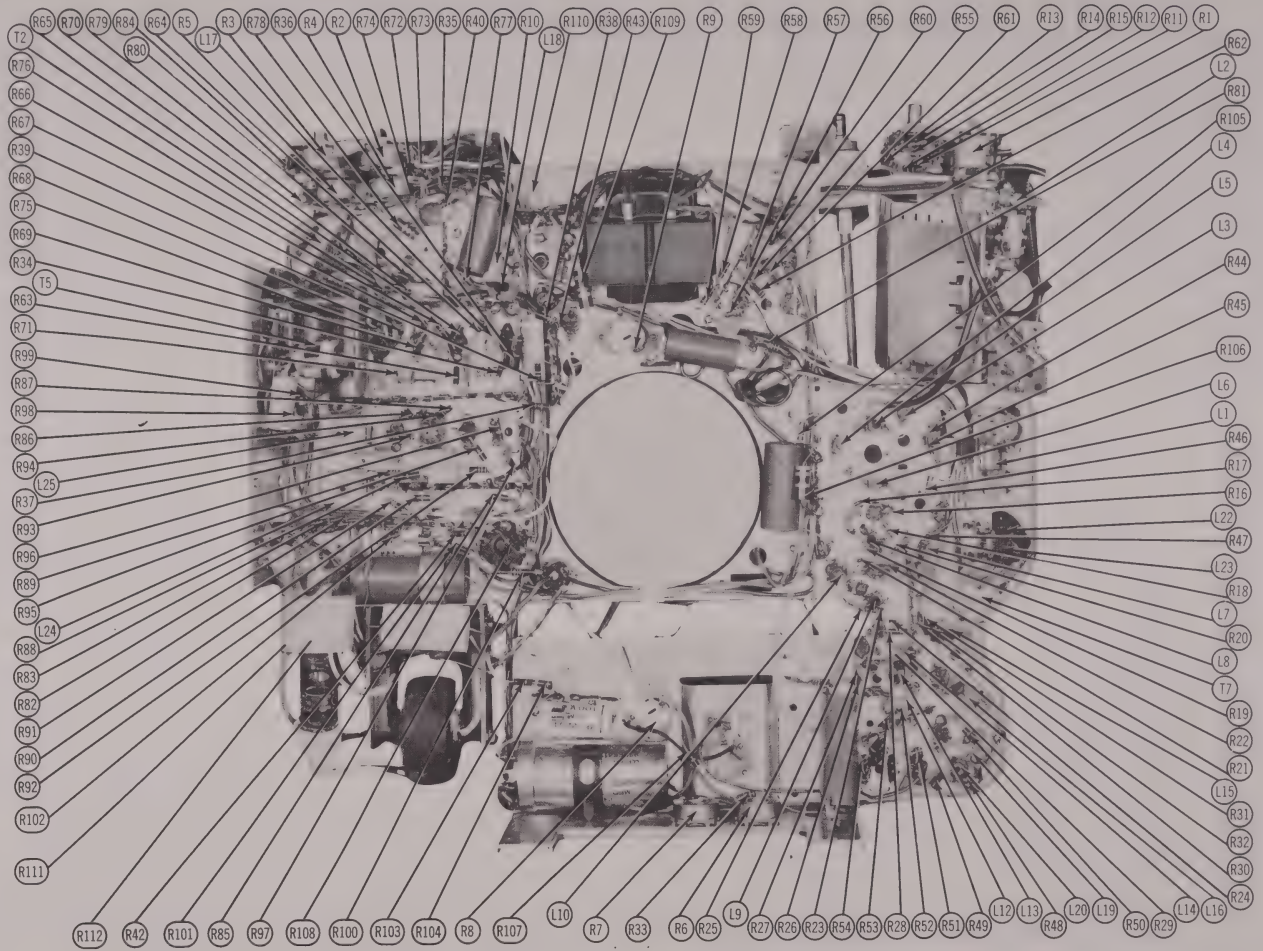
To adjust the Video Bias control, tune in a channel which produces a satisfactory picture. Turn Contrast control fully clockwise. Turn Video Bias control clockwise (as viewed from rear of receiver) until loss of light gray picture information and/or white limiting is observed. Back off on control until no limiting is observed.

B PLUS ADJUST

Connect the DC probe of VTVM to pin 4 of yoke socket. Common to chassis. If Line Voltage is 105AC adjust B+ Set control for 16.5DC. If line voltage is 122VAC adjust for 19.5VDC.

CHARGING CUTOFF ADJUSTMENT

To adjust the Charging Cutoff control, substitute an accurate, well regulated, 26 volt supply in place of the Battery. The supply must either have a current meter or an external current meter, and must be connected in series with one lead of the supply. Connect the supply to the terminal strip that is used to mount the Battery. Close the Charging Cutoff control fully clockwise (as viewed from rear of receiver). Turn the control counterclockwise very slowly until the current meter indicator drops to zero. The relay has a 10-second delay. Therefore allow 15 seconds for relay to catch up between each slight turn.
To check for proper adjustment, decrease the supply voltage to 20 volts, then increase slowly while observing the current meter. If the current drops to zero at 26 volts, the control is adjusted properly.



CHASSIS BOTTOM VIEW - RESISTOR, TRANS., & INDUCTOR IDENT.

ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

Remove deflection yoke plug to eliminate RF interference.
Connect a 17 ohm 20 watt resistor from pin 4 of yoke plug to chassis.
Remove Video Output transistor from its socket.
Remove the AGC Amp. transistor and connect a jumper between the Emitter and Collector terminals of socket.
Set Range switch fully counterclockwise.
Suggested Alignment Tools:
A1, A2, A11, A12, A13, A14 ..... GENERAL CEMENT #8282, 8606, 8606L, 9295, 9440
WALSCO #2526, 2543, 2544, 2545
A3, A4, A10, Mixer Coil ..... GENERAL CEMENT #9296, 9297
WALSCO #2546, 2547
A6 thru A9, 39.75MC Trap on Tuner .... GENERAL CEMENT #8282, 8606, 8606L, 9091
WALSCO #2526, 2541, 2542, 2543, 2544
Mixer Trimmer ..... GENERAL CEMENT #5000, 5003, 5066, 8276, 8290, 9087, 9089
WALSCO #2515, 2525, 2528

VIDEO IF ALIGNMENT

Connect a clip lead from point (A) to chassis.
Detune A3, A4, A7, A8 and A10 by setting cores as far out of coil as possible. Detune A6 by setting core in center of coil.
Set Mixer Trimmer fully counterclockwise.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide a usable pattern on scope.

	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	High side thru 47Ω and .001mfd in series to TP-1. Low side to chassis.	44MC (10MC Swp.)	41.25MC 42.25MC 45.75MC	Any non-interfering channel	Vert. Amp. thru 15K to TP-2. Low side to chassis.	A1, A2	Adjust for equal peaks and markers as shown in Fig. 1. Use maximum core separation.
2.	"	"	"	"	"	A3, A4, A5	Adjust A3 and A4 for maximum gain and symmetry of response similar to Fig. 1 with markers as shown. Adjust A5 for proper bandwidth.
3.	"	"	41.25MC	"	"	A6	Adjust to place marker in trap notch as in Fig. 1. Tune core at end away from chassis.
4.	High side thru .001mfd and 47Ω to Mixer TP. Low side to chassis.	"	39.75MC	"	"	A7 and 39.75MC Trap on Tuner	Remove clip lead from point (A). Adjust in that order to place marker in trap notch. (See Fig. 2.)
5.	"	"	47.25MC	"	"	A8, A9	Adjust to place marker in trap notch as in Fig. 2.
6.	"	"	45.75MC	"	"	A10 and Mixer Coil and Mixer Trimmer	Adjust for maximum gain and symmetry of response similar to Fig. 2 with markers as shown.

SOUND IF ALIGNMENT

Connect a 62K 5% and a 33K 5% resistor in series from point (B) to chassis. (62K next to point (B).) The junction of these two resistors is alignment point (D) as shown on schematic.

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
7.	High side thru .001mfd and 2.2KΩ in series to TP-1. Low side to chassis.	4.5MC (Unmod.)	Any non-interfering channel	DC probe to point (B). Common to chassis.	A11, A12, A13	Adjust for maximum deflection.
8.	"	"	"	DC probe to point (C). Common to point (D).	A14	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

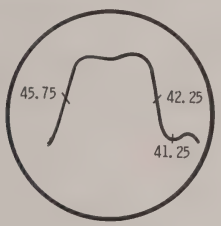


FIG.1

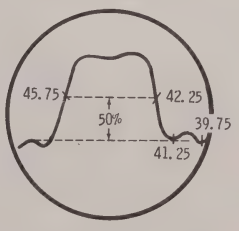
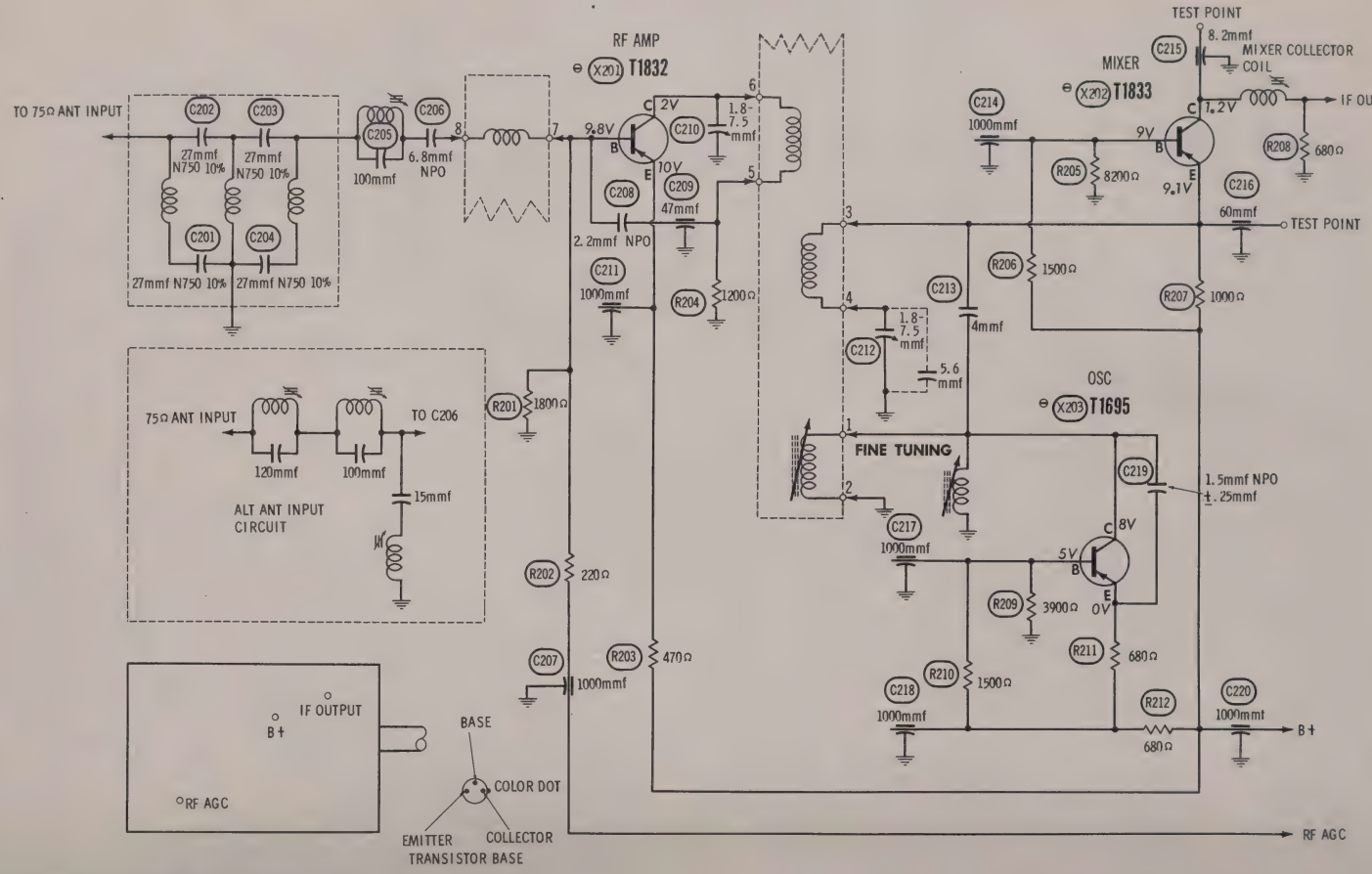


FIG. 2

ALIGNMENT IDENTIFICATION PHOTOS ON PAGES 12 & 15



A PHOTOFACT STANDARD NOTATION SCHEMATIC

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VHF TUNER TT-602A

TV PARTS LIST AND DESCRIPTIONS

TUBES

• GENERAL ELECTRIC •			• RAYTHEON •	SYLVANIA •	
ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V1	HV Rectifier	1S2A			

PICTURE TUBE

ITEM No.	REPLACEMENT DATA					NOTES
	MOTOROLA PART No.	GENERAL ELECTRIC PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
V2	19AEP4					

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA			NOTES
			RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	4454	1st Video IF Amp.				PNP
X2	4454	2nd Video IF Amp.				PNP
X3	4501 *	3rd Video IF Amp.				PNP (* 4509 Alternate)
X4	4457	Video Amp.				PNP
X5	4478	Video Output				PNP
X6	4465	AGC Keying				NPN
X7	4473	AGC Amp.				PNP
X8	4456	Sound IF Amp.				PNP
X9	4466	Audio Driver				PNP
X10	4468	Audio Output		2N360		PNP
X11	4468	Audio Output		2N360		PNP
X12	4464	Sync Sep.				NPN
X13	4473	Sync Phase Inv.				PNP
X14	4473	Vert. Osc.				PNP
X15	4461	Vert. Output				PNP Note 1
X16	4462	Horiz. Osc.				PNP
X17	4465	Horiz. Buffer				NPN
X18	4460	Horiz. Driver				PNP
X19	4459	Horiz. Output				PNP Note 1
X20	4459	Horiz. Output				PNP Note 1
X21	4510	Filter Amp.				PNP Note 1
X22	4463	Filter				PNP

Note 1. When replacing, apply DC-4 grease (Pt. #11M490487) or equivalent to both sides of insulator. Tighten mounting screws securely. Check bias adjustments.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	MOTOROLA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1A	▲500	25	23C65413A01					TVLS-1250 *	
B	■2000	30						TVA-1209	
C2	1000	25	23C65282A15		BRH2510			TVAS-1211 *	
C3	1000	15	23C65282A05	PRS1230	BRH1510	TC1501	TD-1000-15	TVA-1163	
C4	500	15	23C65282A04	PRS1220	BRH155	TC1505	TD-500-15	TVA-1162	
C5	1	15	23C65282A18	PTT-15001	NLW1-50	TT150X1	MLV1-150	TE-1148	
C6	1	15	23C65282A18	PTT-15001	NLW1-50	TT150X1	MLV1-150	TE-1148	
C7	500	15	23C65282A04	PRS1220	BRH155	TC1505	TD-500-15	TVA-1162	
C8	10	15	23C65282A03	PTT-15010	NLW10-15	TT15X10	MLV10-15	TE-1155	
C9	4	10	23C65282A12	XPP-10004	NLW4-15	TT50X4	MLV5-12	TE-1123	
C10	10	6	23C65282A11	PTT-6010	NLW10-6	TT6X10	MLV10-6	TE-1087	
C11	10	15	23C65282A03	PTT-15010	NLW10-15	TT15X10	MLV10-15	TE-1155	
C12	50	15	23C65282A02	PTT-15050	NLW50-15	TT15X50	MLV50-15	TE-1160	
C13	10	15	23C65282A03	PTT-15010	NLW10-15	TT15X10	MLV10-15	TE-1155	
C14	4	15NP	23C65282A17	PRS7405	BBR4-150	TCN504		TVANS-1150 *	
C15	500	15	23C65282A04	PRS1220	BRH155	TC1505	TD-500-15	TVA-1162	
C16	300	18	23C65282A07	PRS1280	BR30015	TC499	TD-300-150	TVAS-1225 *	
C17	300	18	23C65282A06	PRS1280	BR30015	TC499	TD-300-150	TVAS-1225 *	
C18	300	3	23C65282A08	PRS1110	BR30015	TC499	TD-300-150	TVAS-1225 *	
C19	4	10	23C65282A12	XPP-10004	NLW4-15	TT50X4	MLV5-12	TE-1123	
C20	1	15	23C65282A18	PTT-15001	NLW1-50	TT150X1	MLV1-150	TE-1148	
C21	500	3	23C65282A01	PRS1120	BRH605	TC305	TD-500-6	TVA-1103	
C22	500	3	23C65282A01	PRS1120	BRH605	TC305	TD-500-6	TVA-1103	
C23	80	100	23C65282A10	PRS1500	BR8015	TC492	TD-80-150	TVA-1418	
C24	500	25	23C65282A13	PRS1290	BRH255	TC2505	TD-500-25	TVA-1209	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REMARKS	REPLACEMENT DATA					
					AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C25	50000				BPD-05	DD-503	DPMS2S5	1DP-2-503	GP150	5HK-S50
C26	50000				BPD-05	DD-503	DPMS2S5	1DP-2-503	GP150	5HK-S50
C27	15	NPO	10%		NPO-DI 15	DTZ-15	C10Q15C	CCTO-150	CNO-415	10TCC-Q15
C28	75-350			#20B65476A01				428		
C29	4.7	NPO	±.5mmf		NPO-DI 4.7	DTZ-4R7	C10V47C	CCTO-4R7	CNO-547	10TCC-V47
C30	8.2	N150	±.5mmf	#21R128940				*		10TCP-V82
C31	12	NPO	5%			TCZ-12	C10Q12C	CCTO-120	CNO-412	10TCC-Q12
C32	33	NPO	10%		NPO-DI 33	DTZ-33	C10Q33C	CCTO-330	CNO-433	10TCC-Q33
C33	8.2	N150	±.5mmf	#21R128940				*		10TCP-V82
C34	15	NPO	10%		NPO-DI 15	DTZ-33	C10Q15C	CCTO-150	CNO-415	10TCC-Q15
C35	.68		10%		NPO-SI .68	TCZ-R68				
C36	1000		10%		DI-1000	DD-102	5R5DI	CCD-102	GP210	10TS-DI0
C37	1000		10%		DI-1000	DD-102	5R5DI	CCD-102	GP210	10TS-DI0
C38	15	NPO	10%		NPO-DI 15	DTZ-15	C10Q15C	CCTO-150	CNO-415	10TCC-Q15
C39	.68		10%		NPO-SI .68	TCZ-R68				
C40	1000		10%		DI-1000	DD-102	5R5DI	CCD-102	GP210	10TS-DI0
C41	1000		10%		DI-1000	DD-102	5R5DI	CCD-102	GP210	10TS-DI0
C42	4.7	NPO	±.5mmf		NPO-DI 4.7	DTZ-4R7	C10V47C	CCTO-4R7	CNO-547	10TCC-V47
C43	50000				BPD-05	DD-503	DPMS2S5	1DP-2-503	GP150	5HK-S50
C44	68	N750	5%			DTN-68	C10Q68U		CN7-468	10TCU-Q68

FIXED CAPACITORS (cont)

ITEM No.	RATING			REMARKS	REPLACEMENT DATA ASEROVOX Part No.	CENTRALAB Part No.	CORNELL DUBILIER Part No.	SIMPSON Part No.	MALLORY Part No.	SPRAGUE Part No.
C45	5000				BPD-005	DD-503	BYA10D5	CCD-503	B-350	5HK-D50
C46	10	NPO	10%		NPO-DI 10	DTZ-10	CY02S0	CCTO-100	CMO-410	10TCC-Q10
C47	1000	10%			DI-1000	DD-102	SR5D1	CCD-102	GP310	10TS-D10
C48	18	N330	10%	#2UR126631				*		10TCS-Q18
C49	82	N750	10%			TCN-82	C10Q82U	* CCTN-820	CNT-482	10TCU-Q82
C50	33	N150	10%	#2UR119913				*		10TCP-Q33
C51	.1	200V			P388N-1	DF-104	CUB3P1	3DP-3-104	GEM-201	2TM-P10
C52	5000				BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C53	10000				BPD-01	DD-103	BYA10B	CCD-103	B-110	5HK-S10
C54	10000				BPD-01	DD-103	BYA10B	CCD-103	B-110	5HK-S10
C55	330		10%		DI-330	DD-331	L10T33	CCD-331	GP322	10TS-T22
C56	10000				BPD-01	DD-103	BYA10B	CCD-103	B-110	5HK-S10
C57	330		10%		DI-330	DD-330	L10T33	CCD-331	GP322	10TS-T22
C58	10000				BPD-01	DD-103	BYA10B	CCD-103	B-110	5HK-S10
C59	10000				BPD-01	DD-103	BYA10B	CCD-103	B-110	5HK-S10
C60	470		10%		DE-470	DD-471	SR5T47	CCD-471	GP347	10TS-T47
C61	470		10%		DE-470	DD-471	SR5T47	CCD-471	GP347	10TS-T47
C62	25000						DPM5S825	4DP-2-253	GEM-4125	5HK-S25
C63	50000				BPD-01	DD-503	DPM5S825	1DP-2-503	GP150	5HK-S50
C64	.5	100V			P388N-5		CUB3P5	1DP-4-504	GEM-205	2TM-P50
C65	10000				BPD-01	DD-103	BYA10B	CCD-103	B-110	5HK-S10
C66	50000				BPD-05	DD-503	DPM5S825	1DP-2-503	GP150	5HK-S50
C67	10000				BPD-01	DD-103	BYA10B	CCD-103	B-110	5HK-S10
C68	470		10%		DE-470	DD-471	SR5T47	CCD-471	GP347	10TS-T47
C69	470		10%		DE-470	DD-471	SR5T47	CCD-471	GP347	10TS-T47
C70	25000						DPM5S825	4DP-2-253	GEM-4125	5HK-S25
C71	25000						DPM5S825	4DP-2-253	GEM-4125	5HK-S25
C72	.25	100V			P388N-25		CUB2P25	1DP-3-254	GEM-3025	2TM-P25
C73	.02	200V	10%		V84C4S3-10%		PM2S3	4DP-2-203	GEM-4123	2TM-S20
C74	1000		10%		DE-1000	DD-102	SR5D1	CCD-102	GP310	10TS-D10
C75	.02	200V	10%		V84C4S3-10%		PM2S3	4DP-2-203	GEM-4123	2TM-S20
C76	1000		10%		DI-1000	DD-102	SR5D1	CCD-102	GP310	10TS-D10
C77	25000						DPM5S825	4DP-2-253	GEM-4125	5HK-S25
C78	50000				BPD-05	DD-503	DPM5S825	1DP-2-503	GP150	5HK-S50
C79	25000						DPM5S825	4DP-2-253	GEM-4125	5HK-S25
C80	25000						DPM5S825	4DP-2-253	GEM-4125	5HK-S25
C81	3000		10%		DI-3000		SR5D3	CCD-302	GP320	10TS-D30
C82	.25	100V			P388N-25		CUB2P25	1DP-3-254	GEM-3025	2TM-P25
C83	.2	200V	10%		V84C2P25-10%		PM2P25	3DP-4-204	GEM-2022	2PS-P20
C84	.5	100V			P388N-5		CUB2P5	1DP-4-504	GEM-205	2TM-P50
C85	6.5	25V		#6B65525A01						
C86	25000						DPM5S825	4DP-2-253	GEM-4125	5HK-S25
C87	1000		10%		DI-1000	DD-102	SR5D1	CCD-102	GP310	10TS-D10
C88	1000		10%		DI-1000	DD-102	SR5D1	CCD-102	GP310	10TS-D10
C89	10000				BPD-01	DD-103	BYA10B	CCD-103	B-110	5HK-S10
C90	10000				BPD-01	DD-103	BYA10B	CCD-103	B-110	5HK-S10

Motorola Part Number

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

CONTROLS

ITEM No.	RATING RESISTANCE	WATTS	REPLACEMENT DATA MOTOROLA Part No.	CENTRALAB Part No.	CLAROSTAT Part No.	CTS—IRC Part No.	MALLORY Part No.	INSTALLATION NOTES
R1A	20K	½	1BD5218A02					Volume
B	Switch							Power Off-On, Charging On-Contrast Off
R2A	250Ω	½	1BD5218A03	TT-2 *		BU-201 *		
B	Shaft		Not Req.	Not Req.		TM4		
R3A	1meg	½	1BD5218A01	TT-69 *	B47-1meg-S *	BU-137 *	PTA1254L *	Brightness
B	Shaft		Not Req.	Not Req.	Not Req.	TM4	Not Req.	
R4A	500Ω	½	1BD5236A03			-		Vert. Hold
B	1000Ω					-		Vert. Size (Height)
R5A	10K	½	1BD5236A01					Horiz. Hold
B	200Ω							Vert. Linearity
R6A	2500Ω	½	1BD5218A04	TT-8	B47-2500-S	BU-111	PTA252L	AGC
B	Shaft			Not Req.	Not Req.	TM4	Not Req.	
R7A	2500Ω	½	1BD5218A04	TT-8	B47-2500-S	BU-111	PTA252L	Vert. Bias
B	Shaft			Not Req.	Not Req.	TM4	Not Req.	
R8A	500Ω ①	2(WW)	1TK754350	WN-501	A43-500	WU-103	R500L	B+ Set
B	Shaft			Not Req.	FK3-1/4	SK3	Not Req.	
R9A	3500Ω	2(WW)	1TK754147	WN-401	A43-400	WU-303		Charging Cutoff
B	Shaft			Not Req.	FK3-1/4	SK3		
R10A	2500Ω	½	1BD5218A04	TT-8	B47-2500-S	BU-111	PTA252L	Video Bias
B	Shaft			Not Req.	Not Req.	TM4	Not Req.	

* File flat for knob.

① Some versions may use 125Ω in this application.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise stated.

ITEM No.	RATING	REPLACEMENT DATA IRC Part No.	WORKMAN TV Part No.	REMARKS
R11	56Ω			
R12	56Ω			
R13	15Ω			
R14	2200Ω			
R15	390Ω			
R16	1200Ω			
R17	2700Ω			
R18	1200Ω			
R19	680Ω			
R20	1200Ω			
R21	2700Ω			
R22	1200Ω			
R23	680Ω			
R24	1200Ω			
R25	2700Ω			
R26	220Ω			
R27	18Ω			
R28	1200Ω			
R29	5600Ω			
R30	1000Ω			
R31	220Ω			
R32	560Ω			
R33	390Ω			
R34	47Ω			
R35	390Ω			
R36	8200Ω 2W			
R37	560Ω			
R38	33K			
R39	100K			
R40	68K			
R41	33K			
R42	4700Ω			
R43	22K			
R44	10K			
R45	4700Ω			
R46	4700Ω			
R47	820Ω			
R48	2700Ω			
R49	1000Ω			
R50	3300Ω			
R51	470Ω			
R52	15K			
R53	680Ω			
R54	220Ω			
R55	10K			
R56	56K			

RESISTORS (cont)

ITEM No.	RATING	REPLACEMENT DATA IRC Part No.	WORKMAN TV Part No.	REMARKS
R57	1000Ω			
R58	56Ω			
R59	4700Ω			
R60	6.8Ω			
R61	5.6Ω			
R62	470Ω			
R63	2200Ω			
R64	56K			
R65	6800Ω			
R66	10K			
R67	5600Ω			
R68	560Ω			
R69	1000Ω			
R70	560Ω			
R71	5600Ω			
R72	4700Ω			
R73	3300Ω			
R74	330Ω			
R75	100Ω			
R76	220Ω			
R77	6800Ω			
R78	2.7Ω 1W			
R79	82Ω			
R80	16Ω (Cold)			#6C85702A01
R81	4700			
R82	4700Ω			
R83	12000			
R84	12K			
R85	10K			
R86	100K			
R87	100K			
R88	1200Ω			
R89	470Ω			
R90	1000Ω			
R91	330Ω			
R92	68K			
R93	8200Ω			
R94	1000Ω			
R95	100Ω			
R96	1000Ω			
R97	3900Ω			
R98	2.7Ω			
R99	2.7Ω			
R100	680Ω			
R101	8200Ω			
R102	6800Ω			
R103	10Ω			
R104	100Ω			
R105	130Ω			
R106	33Ω 2W			
R107	3200Ω			
R108	2200Ω			
R109	150Ω 2W			
R110	5Ω (Cold)			#17C85604A01
R111	.47Ω			
R112	22K			

Motorola Part Number

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA MOTOROLA Part No.	Merit Part No.	Miller Part No.	Stancor Part No.	Workman TV Part No.	NOTES
L1	Antenna Coil	24K754064					
L2	39.75MC Trap	24K754209					
L3	39.75MC Trap	24D6568AA01	TV-152	6225	RTC-8556	T218	
L4	47.25MC Trap	24K754209	TV-153	6225	RTC-8556	T218	
L5	1st Video IF	24K754208	TV-151	6230	RTC-8626	T219	
L6	47.25MC Trap	24K754209	TV-153	6225	RTC-8556	T218	
L7	RF Choke (7.5uh)	24K743727 ①	BC-565	4611	RTC-8521	T822	① IRC Part #CLA.
L8	2nd Video IF	24K754208					
L9	3rd Video IF	24K754208					
L10	41.25MC Trap	24D6568AA09	TV-152	6225	RTC-8556	T218	
L11	4th Video IF	24K754227 ②					② Includes Complete Assy.
L12	RF Choke (7.5uh)	24K743727 ①	BC-565	4611	RTC-8521	T822	
L13	Peaking (330uh)	24K749969	TV-200	6132	RTC-8577	T319	
L14	RF Choke (7.5uh)	24K743727 ①	BC-565	4611	RTC-8521	T822	
L15	4.5MC Trap	24D6526AA01	TV-151	1470	RTC-8603	T250	
L16	RF Choke (7.5uh)	24K743727 ①	BC-565	4611	RTC-8521	T822	
L17	Peaking (100uh)	24K753234 ③	TV-184	6180 *	RTC-8587 *	T310 *	③ Includes 5600Ω Resistor a Parallel with 5600Ω Res.
L18	Peaking (500uh)	24C749508	TV-203	6174	RTC-8592	T324	
L19	RF Choke (7.5uh)	24K743727 ①	BC-565	4611	RTC-8521	T822	
L20	Sound IF	24C65281A01					
L21	Ratio Detector	24C65434A01					
L22	Line Choke (10uh)	24C65775A01	BC-537	5220	RTC-8582	T963	
L23	Line Choke (10uh)	24C65775A01	BC-537	5220	RTC-8582	T963	

COILS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA MOTOROLA Part No.	Merit Part No.	Miller Part No.	Rogers Part No.	Stancor Part No.	Thordarson Part No.	Triad Part No.	Workman TV Part No.
L24	Horiz. Ringing	24D65264A03							
L25	Horiz. Blocking Osc.	24D65264A04							
L26	Horiz. Buffer	24D65264A02							

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	SEC. 1	SEC. 2	REPLACEMENT DATA MOTOROLA Part No.	Merit Part No.	Stancor Part No.	Thordarson Part No.	Triad Part No.	NOTES
T1	117V	37VCT		25C65392A01-B					① Alternate Part
	② .5A	② 1.5A DC		①					#25C65392A01

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA MOTOROLA Part No.	Merit Part No.	Rogers Part No.	Stancor Part No.	Thordarson Part No.	Triad Part No.	NOTES
T2	Vert. Osc.	25D65279A01-C						
	Alt. Vert. Osc.	25D65279A01						
T3	Vert. Output	25K754203-AK						
	Alt. Vert. Output	25K754203						
T4	Yoke (Horiz. 1MJD 110° (Vert. 40MH)	24K754091-AB						
	Alt. Yoke	24K754091						
	Rear Cover and Centering Device	59K754292						
T5	Horiz. Driver	42A743819						
T6	Horiz. Output	24D65431A03						
	Secondary Coil	24D65432A01						
	Primary Coil	24D65431A01						

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO PRI.	SEC.	REPLACEMENT DATA MOTOROLA Part No.	Merit Part No.	Stancor Part No.	Thordarson Part No.	Triad Part No.	NOTES
T7	2.5	1	25C753624-C ①					① Alternate Part #25C753624

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	SEC.	REPLACEMENT DATA MOTOROLA Part No.	Merit Part No.	Stancor Part No.	Thordarson Part No.	Triad Part No.	NOTES
T8	160Ω CT	3-4Ω	25D65280A01-O					① Alternate Part #25D65280A01

SPEAKER

ITEM No.	TYPE SIZE	FIELD	V. C. IMP	REPLACEMENT DATA MOTOROLA Part No.	QUAM Part No.	NOTES
SP1	3" x 5"	PM	3-4Ω	50C6551LA01	35A05	

POWER RECTIFIERS

ITEM No.	RATING CURRENT (Measured)	REPLACEMENT DATA MOTOROLA Part No.	RCA Part No.	SARKES TARZIAN Part No.	LITTELFUSE Part No.	SYLVANIA Part No.	NOTES
M1	1.5A	48C6556LA02 *					LV Power Supply Rectifier
M2	1.5A	48C6595LA02 *					LV Power Supply Rectifier
M3	.010A	48C6556LA01 *	1N1763 *	40H	SR500 *	SR500 *	Video Supply
M4	.00A	48C6595LA01 *	1N1763 *	40H *	SR500 *		Picture Tube Cath. & Screen Supply
M5	.600A	48A134467 *					Damper * Silicon

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA MOTOROLA Part No. FUSE	HOLDER	LITTELFUSE Part No. FUSE	HOLDER	BUSS Part No. FUSE	HOLDER
M8	N	3/4A 125V 8/B	65K754349	9K754348	333 750 (N 3/4A 125V 8/B)	348010	N 3/4	HN 1/2 to 3/4
M7	3AG	3A 250V 8/B	65A740670		31603 (3AG 3A 250V 8/B)		MDV3	

SIGNAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA MOTOROLA	GENERAL ELECTRIC Part No.	RAYTHEON Part No.	SYLVANIA Part No.	NOTES
M8		48K742698 *	6GDI *			* Dual Selenium, Series Connected, Horizontal AFC
M9		48K747548 †		1N295 †	1N395 †	† Crystal Diode, Clip in, Video Det.
M10	1N541	48P6510SA19 †		1N295 †	1N395 †	† Crystal Diode, Matched Pair, Pigtail, Ratio Det.
M11	1N541	48P6510SA19 †		1N295 †	1N395 †	
M12	1N60	48K640754 *		1N60 *	1N60 *	* Crystal Diode, Vert. Pulse Blocking, Pigtail

MISCELLANEOUS

ITEM No.	PART NAME	MOTOROLA Part No.	NOTES
M13	Tuner	7TD65284A01	VHF Complete (TT-602), Includes Transistors and Hi-pass Filter Assembly
M14	Switch	40A65449A01	Range Selector, Rotary Type
M15	Switch		Antenna (SPDT Slide Type)
M16	Switch	40C65513A01	AC, Line-Energy Cell-AC Changeover (Actuated by Plunger on AC Socket)
M17	Relay	80C65338A01	Charging Cutoff
M18	Antenna and Bracket Assembly	19S6293A58	Includes Antenna (#8A753536), Sleeve & Spring, Antenna Collar, Insulating Washers, & Antenna Bushing. JFD REPLACEMENT #TA408

BATTERIES

ITEM No.	VOLTAGE	MOTOROLA Part No.	REPLACEMENT DATA BURGESS "A"	BURGESS "B"	EVEREADY "A"	EVEREADY "B"	MALLORY "A"	MALLORY "B"	NOTES
	18V	50E753627 *							*Special Silver Cadmium, Rechargeable Type

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Safety Glass	81B65361A01	
Mask	12B65027A01	
Knob	36D65446A01	Channel Selector
Knob	36C753350	Fine Tuning
Knob	36D65437A03	Brightness, Model 19P1-1

TV PARTS LIST AND DESCRIPTIONS (Continued)

CABINETS & CABINET PARTS (cont)

NAME	PART NO.	DESCRIPTION
Knob	36D65437A15	Brightness, Model 19P1-2
Knob	36D65437A04	Contrast, Model 19P1-1
Knob	36D65437A16	Contrast, Model 19P1-2
Knob	36D65437A02	Volume On-Off, Model 19P1-1
Knob	36D65437A14	Volume On-Off, Model 19P1-2
Knob	36D65437A05	Horizontal Hold, Model 19P1-1
Knob	36D65437A17	Horizontal Hold, Model 19P1-2
Knob	36D55437A01	Range, Model 19P1-1
Knob	36D65437A13	Range, Model 19P1-2
Cabinet	1V65294A27	Model 19P1-1
Cabinet	1V65294A31	Model 19P1-2
Cabinet (Front Cover)	1V65294A28	Model 19P1-1
Cabinet (Front Cover)	1V65294A02	Model 19P1-2
Handle	55K754197	With Plate & Plate Cover, Model 19P1-1
Handle	55K754285	With Plate & Plate Cover, Model 19P1-2

WIRING DATA

High Voltage Lead	Use BELDEN No. 8869
Shielded Hook-up Wire	Use BELDEN No. 8885 (Single Conductor) 8738 (Two Conductor)
General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord (Interlock Type)	Use BELDEN No. 8874
300Ω Tuner Input Lead	Use BELDEN No. 8225
300Ω Antenna Lead-in	Use BELDEN No. 8230 or 8275
Antenna Rotor Cable	Use BELDEN No. 8464 (Flat) or 8484 (Round) - 4 Conductor 8485 (Round) - 5 Conductor 8488 (Round) - 8 Conductor

TUNER PARTS LIST AND DESCRIPTIONS

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA			NOTES
			RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X201	T-1832	R.F Amplifier				PNP
	4484 *	R.F Amplifier				PNP
X202	T-1833	Mixer				PNP
	4486 *	Mixer				PNP
X203	T-1695	Osc.				PNP
	4485 *	Osc.				PNP

* Alternate

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C201	27 N750 10%		N750-DI 25	TCZ-27	C10Q27U	CCTN-270	CN7-427	10TCU-Q27
C202	27 N750 10%		N750-DI 25	TCZ-27	C10Q27U	CCTN-270	CN7-427	10TCU-Q27
C203	27 N750 10%		N750-DI 25	TCZ-27	C10Q27U	CCTN-270	CN7-427	10TCU-Q27
C204	27 N750 10T		N750-DI 25	TCZ-27	C10Q27U	CCTN-270	CN7-427	10TCU-Q27
C205	100		NPO-DI 100	DTZ-100	C10T1C	CCTO-101	CNO-310	10TCC-T10
C206	6.8 NPO		NPO-DI 6.8	DTZ-6R8	C10V68C	CCTO-6R8	CNO-568	10TCC-V68
C207	1000		EF-001	MFT-1000		CCF-102	CT280A	
C208	2.2 NPO		NPO-DI 2.2	DTZ-2R2	C10V22C	CCTO-2R2	CNO-522	10TCC-V22
C209	47	#21P65113A23						
C210	1.8-7.5			829-7				
C211	1000		EF-001	MFT-1000		CCF-102	CT280A	
C212	1.8-7.5			829-7				
C213	4				C10V4C			10TCC-V39
C214	1000		EF-001	MFT-1000		CCF-102	CT280A	
C215	8.2	#21P65113A27						
C216	60	#21P65113A26						
C217	1000		EF-001	MFT-1000		CCF-102	CT280A	
C218	1000		EF-001	MFT-1000		CCF-102	CT280A	
C219	1.5 NPO ±.25mmf		NPO-DI 1.5	DTZ-1R5	C10V15C		CNO-515	10TCC-V15
C220	1000		EF-001	MFT-1000		CCF-102	CT280A	

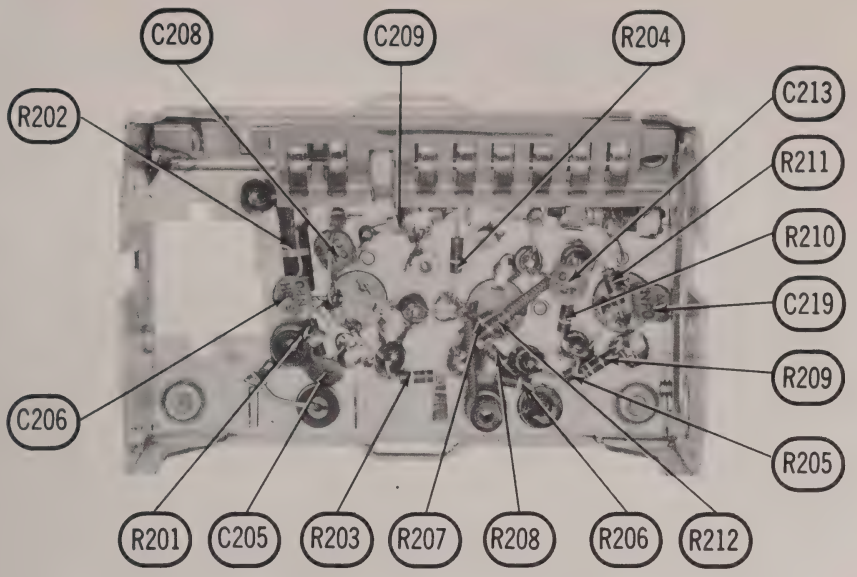
\# Motorola Part Number

RESISTORS

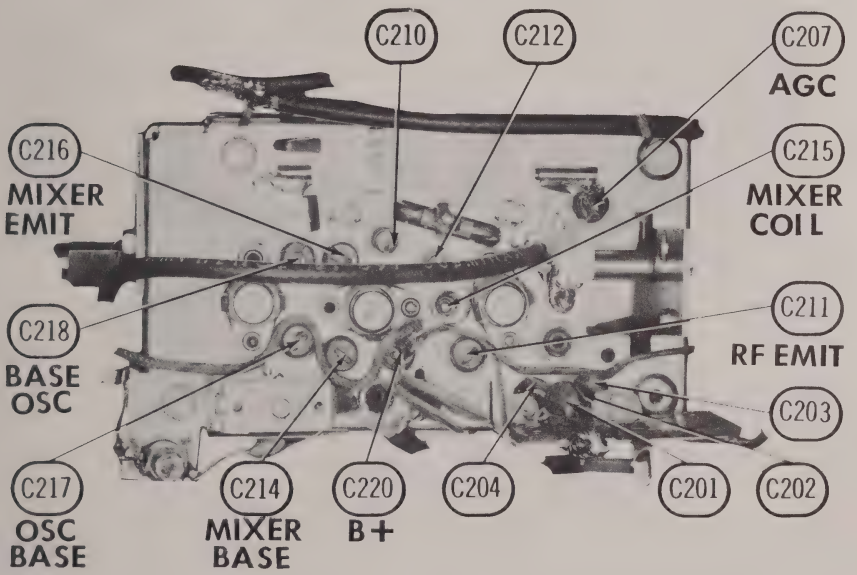
All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REPLACEMENT DATA		REMARKS
		IRC PART No.	WORKMAN TV PART No.	
R201	1800Ω			
R202	220Ω			
R203	470Ω			
R204	1200Ω			
R205	8200Ω			
R206	1500Ω			

ITEM No.	RATING	REPLACEMENT DATA		REMARKS
		IRC PART No.	WORKMAN TV PART No.	
R207	1000Ω			
R208	680Ω			
R209	3900Ω			
R210	1500Ω			
R211	680Ω			
R212	680Ω			



VHF TUNER TT-602A TOP VIEW



VHF TUNER TT-602A BOTTOM VIEW

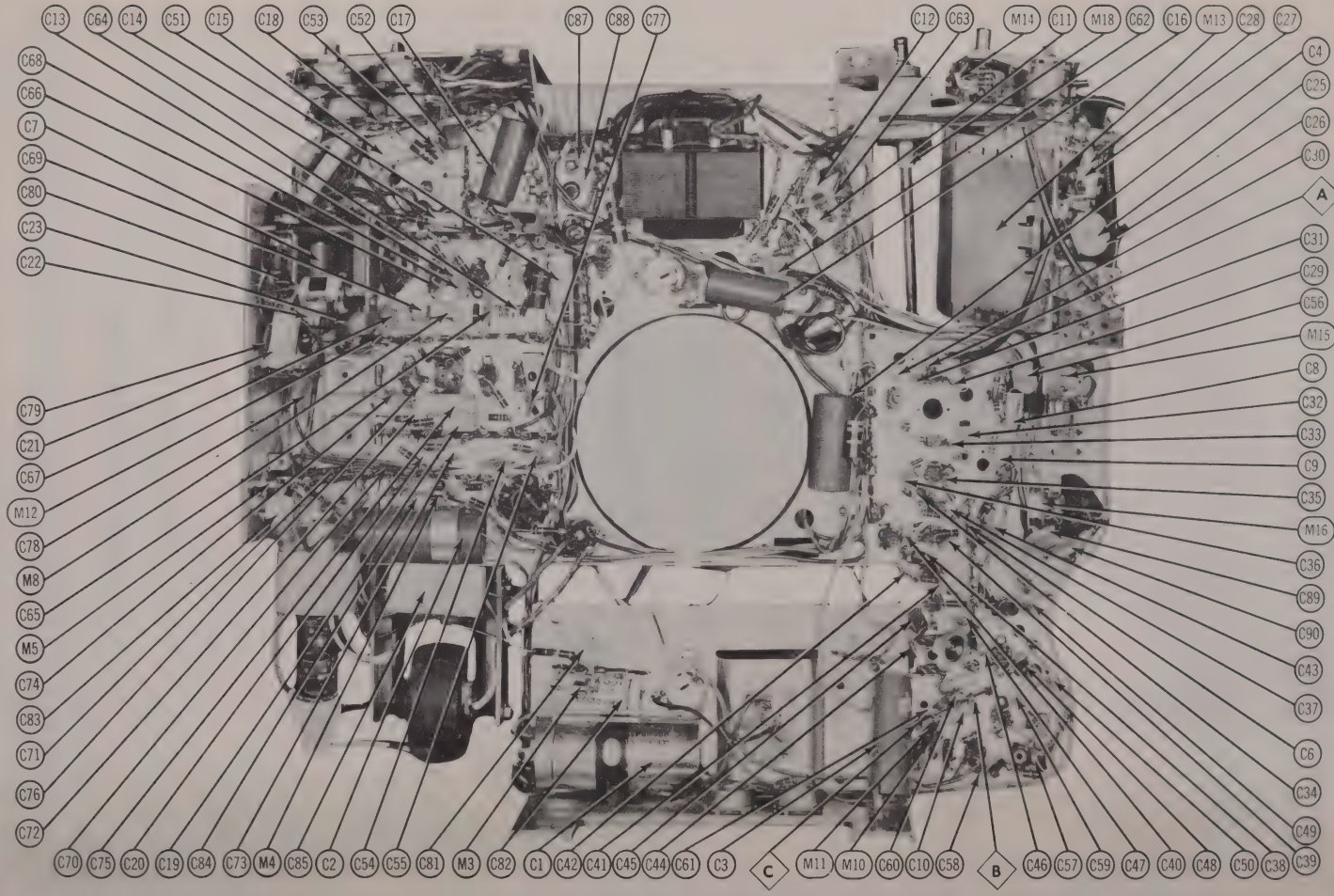
TUNER ALIGNMENT INSTRUCTIONS

VHF OSCILLATOR ALIGNMENT

The individual channel adjustment screws are accessible one at a time, thru a hole in the front of the tuner, as the Channel Selector is rotated. Set the Fine Tuning to the center of its range and switch to channel to be adjusted and adjust for best picture and sound.

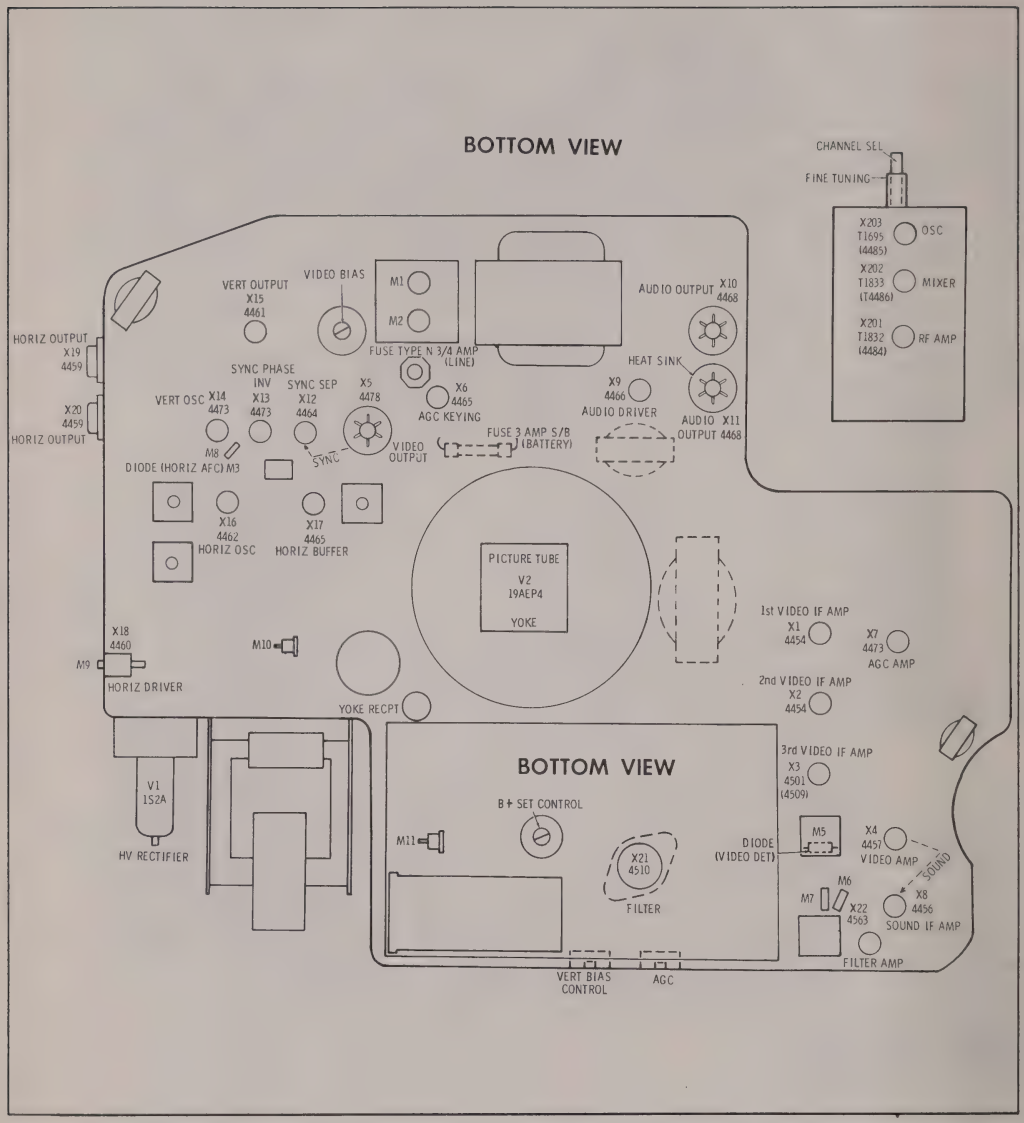
VHF RF AND MIXER ALIGNMENT

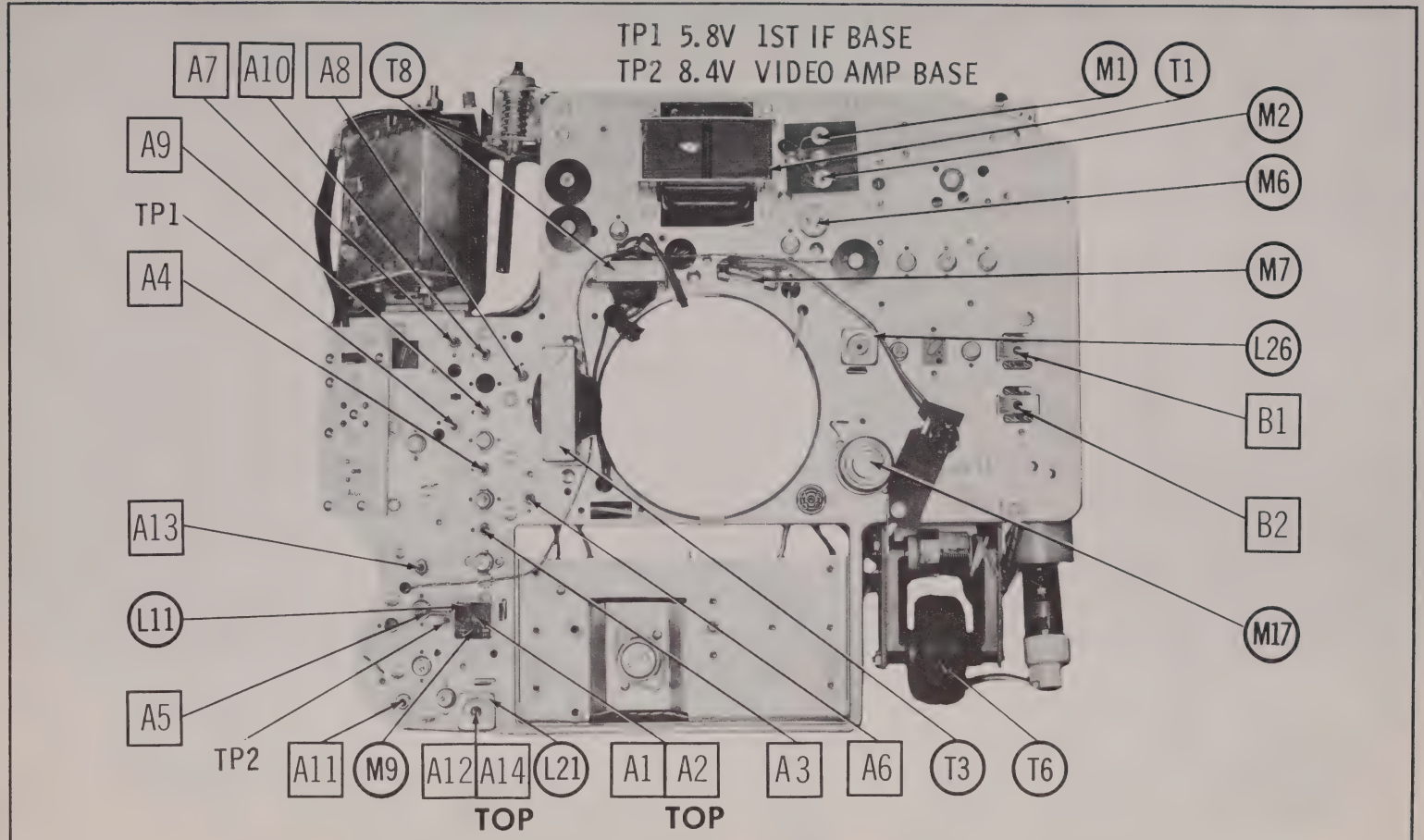
This portion of the tuner has been properly aligned at the factory and is very stable. Alignment of this portion should not be attempted in the field.



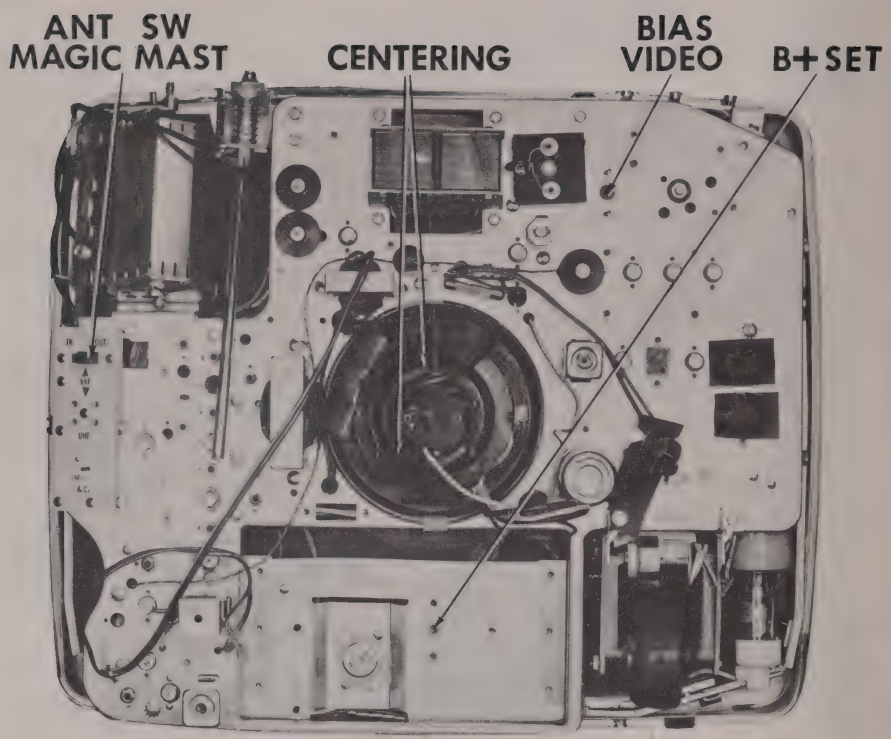
CHASSIS BOTTOM VIEW - ALIGN., MISC., & CAPACITOR IDENT.

TRANSISTOR & TUBE PLACEMENT CHART





CHASSIS - TOP VIEW



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Set the Horizontal Hold control to the center of its range. Place the Horizontal Test Receptacle jumper as shown in Fig. 3. Adjust the Horizontal Blocking Oscillator slug (B1) so the picture is almost synchronized horizontally. Remove the jumper and adjust the Horizontal Ringing Coil slug (B2) until the picture is synchronized horizontally as close as possible. Replace the jumper as in Fig. 4 and adjust Horizontal Hold control until picture synchronizes horizontally.

FIG. 3

FIG. 4

DISASSEMBLY INSTRUCTIONS

CABINET REMOVAL

1. Remove 8 push-on type knobs at top.
2. Remove 2 screws (under handle) holding top panel.
3. Remove 2 screws at top and 2 screws at bottom holding cabinet.
4. Pull cabinet part way back and disconnect speaker leads.
5. Remove cabinet from picture tube and chassis assembly.

PICTURE TUBE REMOVAL

It is necessary to remove the cabinet (Follow steps in "Cabinet Removal") and to separate chassis from picture tube by removing 7 screws holding chassis to picture tube mounting and by removing yoke plug, picture tube socket, and high voltage lead.

PHOTOFACT® Folder

PRODUCTION CHANGE BULLETIN 254

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 1 IN SET 467

TRAV-LER MODELS 17P6025, 21K6046 (CH. 1150-49, 1159-120)

Trav-Ler Models X1770, U, 1788, U, 1790, U (Ch. 1150-19, 1156-39) were covered in PHOTOFACT Folder 1 - Set 467.

Models 17P6025, 21K6046 (Ch. 1150-49, 1159-120) which are electrically similar except for the following changes.

Ch. 1150-49

COMPONENT CHANGES

R1A, B (Off-On-Volume Control) is changed to Part #VC-173 .

R2A (Contrast Control) is changed to Part #VC-178.

R2B (Vertical Linearity Control) is changed to Part #VC-85A.

R3A (Vertical Hold Control) is changed to Part #VC-207.

R3B (Vertical Size Control) is changed to Part #VC-78.

R5A (Brightness Control) is changed to Part #VC-206.

T2 (Deflection Yoke) is changed to Part #L-149C.

V14 (Picture Tube) is changed to a Type 21DAP4.

Ch. 1159-120

COMPONENT CHANGES

L14 (Filter Choke) is changed to Part #FC-5.

R3B (Vertical Size Control) is changed to Part #VC-78.

R2B (Vertical Linearity Control) is changed to Part #VC-85A.

R1A, B (Off-On-Volume Control) is changed to Part #VC-214.

R3A (Vertical Hold Control) is changed to Part #VC-216.

TUNER CHANGE

The Tuner is changed to Part #TA-59. This tuner uses a Type 2FH5 RF amplifier instead of a Type 2BN4. The RF amplifier tubes are not interchangeable.

PRODUCTION CHANGE BULLETIN 254

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 20 IN SET 506

TOSHIBA MODEL 6TP-354

Toshiba Model 6TP-354 was covered in PHOTOFACT Folder 20 - Set 506

The following changes were made during late production.

COMPONENT CHANGES

C3A is decreased from 30mfd to 20mfd.

C3B is increased from 30mfd to 50mfd.

R18 is increased from 10Ω to 22Ω.

R19 is increased from 150Ω to 220Ω.

SET 520 FOLDER 3

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1961 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 1 IN SET 465

General Electric Models 17T3304, 17T3305, 17T3306, 17T3310, 17T3311, 17T3315, 17T3316, 17T3317, 17T3318, 17T3320, 17T3321, 17T3331, 21C3434, 21C3440, 21C3441, 21C3442, 21C3443, 21C3445, 21C3446, 21C3450, 21C3451, 21C3458, 21C3459, 21C3460, 21C3461, 21C3478, 21C3479, 21C3482, 21C3483, 21L3455, 21L3456, 21T3417, 21T3418, 21T3419, 21T3420, 21T3421, 21T3425, 21T3429, 21T3430, 21T3431, 21T3432, 21T3435, 21T3436 (Ch. M5) were covered in PHOTOFACT Folder 1 - Set 465.

Models M300TGR, M301TGR, M302TBN, M303TBN, SAM300TGR, SAM302TBN, TEB, TGL, SAM303TGL, SCM302TBN, 17T3306A, B, C, 17T3307, 17T3308, 17T3312, 17T3313, 17T3314, 17T3315G, 17T3319, 17T3320A, M, R, S, 17T3321R, 17T3322, 17T3324, 17T3334, 21C3438, 21C3460A, 21C3461A, 21C3477, 21C3481, 21C3488, 21C3489, 21C3491, 21C3492, 21T3414, 21T3415, 21T3416, 21T3417A, 21T3418A, 21T3419A, M, 21T3420S, WA, 21T3422, 21T3427, 21T3428, 21T3434, 23C3484, A, 23C3485, 23C3486, 23C3493, 23C3494, 23C3495, 23C3497, 23C3498, 23C3499 (Ch. M5) are electrically similar except for the following changes.

Code 921M5

COMPONENT CHANGE

C18 is increased from 2.7mmf to 3.9mmf.

Code 936M5

COMPONENT CHANGE

L15 is decreased from 680MH to 560MH in all 21 inch chassis.

Code 950M5

COMPONENT CHANGES

V1 is changed from a Type 6CF6 to a Type 6BZ6.

V1 Socket is changed from Part #WT34X130 to Part #WT34X120.

R10 is increased from 100Ω to 220Ω.

R13 is omitted.

R19 is increased from 12meg to 15meg.

R20 is decreased from 180K to 120K.

R22 is decreased from 15K to 6800Ω.

R25 is increased from 120K to 330K.

C10 is decreased from 910mmf to 470mmf.

C13 is decreased from 390mmf to 300mmf.

L4 is changed to Part #WT61X106.

L5 is changed to Part #WT61X107.

COMPONENTS ADDED

A 470Ω ½ watt Resistor is added from Pin 6 of V1 (6BZ6) to the 135 volts source.

An 800mmf Capacitor is added from Pin 6 of V1 (6BZ6) to the junction of L4 & R10.

COMPONENT CHANGES

R203 is increased from 10K to 15K.

A 1000Ω Resistor is added from Pin 3 of V202B (6CL8A) to ground.

PICTURE TUBE ADDED

The 23 inch Models use a Type 23KP4 picture tube.

(Continued On The Reverse Side)

CABINETS & CABINET PARTS

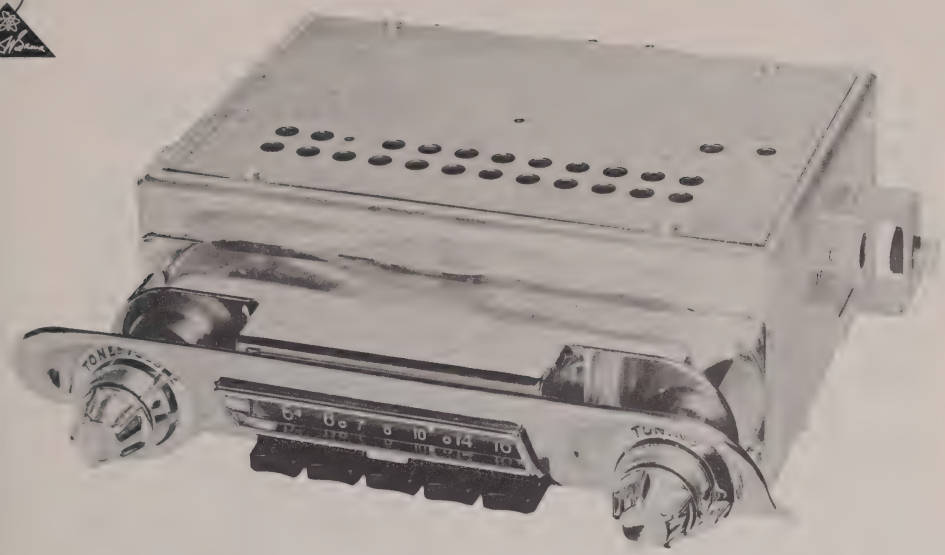
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Safety Glass	WT94X77	Models 21C3438, 21C3460A, 21C3461A, 21C3477, 21C3481, 21C3488, 21C3489, 21C3491, 21C3492, 21T3414, 21T3415, 21T3416, 21T3418A, 21T3419A, M, 21T3420S, WA, 21T3422
Safety Glass	WT94X79	Model 21T3417A
Safety Glass	WT94X81	Models 21T3427, 21T3428, 21T3434
Safety Glass	WT94X82	Model 17T3334
Safety Glass	WT94X83	Models M300TGR, M301TGR, M302TBN, M303TBN, SAM300TGR, SAM302TBN, TEB, TGL, SAM303TBN, TGL, 17T3306A, B, C, 17T3307, 17T3308, 17T3312, 17T3313, 17T3314, 17T3315G, 17T3319, 17T3320A, M, R, S, 17T3321R, 17T3322, 17T3324
Safety Glass	WT94X84	Models 23C3484, A, 23C3485, 23C3486, 23C3493, 23C3494, 23C3495, 23C3497, 23C3499
Mask	WT96X51	Models 21T3414, 21T3415, 21T3416, 21T3417A, 21T3418A, 21T3419A, 21T3420S
Mask	WT96X52	Models 21T3420WA, 21T3422
Mask	WT96X54	Model 21T3434
Mask	WT96X55	Models 23C3484, A, 23C3485, 23C3486, 23C3493, 23C3494, 23C3495, 23C3497, 23C3498, 23C3499
Knob	WT43X295	VHF Channel Selector, All 17" Models except 17T3334
Knob	WT43X299	VHF Channel Selector, Models 21C3438, 77, 81, 91, 92, 21T3414, 15, 16, 17A, 18A, 19A, M, 20S, WA, 22, 27, 28, 23C3484, A, 85, 86, 97, 98, 99
Knob	WT43X301	VHF Channel Selector, Models 17T3334, 21T3434, 23C3493, 23C3494, 23C3495
Knob	WT43X289	UHF Channel Selector, All UHF Models
Knob	WT43X184	VHF Fine Tuning, All 17" Models except 17T3334
Knob	WT43X300	VHF Fine Tuning, Models 21C3438, 77, 81, 91, 92, 21T3414, 15, 16, 17A, 18A, 19A, M, 20S, WA, 22, 27, 28, 23C3484, A, 85, 86, 97, 98, 99
Knob	WT43X304	VHF Fine Tuning, Models 17T3334, 21T3434, 23C3493, 94, 95
Knob	WT43X286	UHF Indicator, All UHF Models
Knob	WT43X298	Off-On-Volume, Vertical Hold, All Models except M300TGR, M301TGR, SAM302TBN, 17T3334, 21C3481, 23C3493, 94, 95, 97, 98, 99
Knob	WT43X303	Off-On-Vertical Hold, Models 17T3334, 21C3481, 23C3493, 94, 95, 97, 98, 99
Knob	WT43X308	Off-On-Volume, Vertical Hold, Models M300TGR, M301TGR, SAM302TBN
Knob	WT43X297	Brightness, All Models
Knob	WT43X296	Contrast, All Models except M300TGR, M301TGR, SAM300TGR, 17T3334, 21C3481, 23C3493, 94, 95, 97, 98, 99
Knob	WT43X302	Contrast, Models 17T3334, 21C3481, 23C3493, 94, 95, 97, 98, 99
Knob	WT43X307	Contrast, Models M300TGR, M301TGR, SAM300TGR
Knob	WT43X301	Program Selector, Models 17T3314, 17T3320M, 21T3419M, 21T3428
Cabinet	WT103X271	Models M300TGR, M301TGR, SAM300TGR
Cabinet	WT103X273	Models M302TBN, M303TBN, SAM302TBN, SAM303TBN
Cabinet	WT103X280	Models M302TEB, TGL, SAM303TGL
Cabinet	WT103X249	Models 17T3306A, B, C, 17T3307, 17T3308
Cabinet	WT103X247	Model 17T3312
Cabinet	WT103X216	Models 17T3313, 17T3320A, M, R, S
Cabinet	WT103X282	Model 17T3314
Cabinet	WT103X214	Models 17T3315G, 17T3319
Cabinet	WT103X221	Models 17T3321R, 17T3324
Cabinet	WT103X248	Model 17T3322
Cabinet	WT103X259	Model 17T3334
Cabinet	WT103X267	Models 21C3438, 21C3477
Cabinet	WT103X228	Model 21C3460A
Cabinet	WT103X299	Model 21C3461A
Cabinet	WT103X263	Model 21C3481
Cabinet	WT103X236	Model 21C3488
Cabinet	WT103X237	Model 21C3489
Cabinet	WT103X239	Model 21C3491
Cabinet	WT103X240	Model 21C3492
Cabinet	WT103X328	Model 21T3414
Cabinet	WT103X222	Models 21T3415, 21T3417A, 21T3418A
Cabinet	WT103X223	Models 21T3416, 21T3419A, M
Cabinet	WT103X224	Model 21T3420S
Cabinet	WT103X268	Model 21T3420WA
Cabinet	WT103X225	Model 21T3422
Cabinet	WT103X246	Models 21T3427, 21T3428
Cabinet	WT103X244	Model 21T3434
Cabinet	WT103X281	Models 23C3484, A
Cabinet	WT103X315	Model 23C3485
Cabinet	WT103X326	Model 23C3486
Cabinet	WT103X277	Model 23C3493
Cabinet	WT103X278	Model 23C3494
Cabinet	WT103X279	Model 23C3495
Cabinet	WT103X274	Model 23C3497
Cabinet	WT103X275	Model 23C3498
Cabinet	WT103X276	Model 23C3499

PHOTOFACT® Folder

**AUTOMATIC MODEL
ATC-60**

AUTOMATIC MODEL
ATC-60



TRADE NAME	Automatic Model ATC-60 (For 1959-1960 Chevrolets)
MANUFACTURER	Automatic Radio Mfg. Co., Inc., 122 Brookline Ave., Boston 15, Mass.
TYPE SET	Battery Operated Custom Built Transistorized Automobile AM Receiver
POWER SUPPLY	12 Volt Storage Battery (Negative Ground) RATING .6 Amp. @ 12.6 Volts DC
TUNING RANGE—BROADCAST	538 — 1610KC

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested Alignment Tools: A1 Thru A4... GENERAL CEMENT #5097, 8727
WALSCO #2515
A5, A6.....GENERAL CEMENT #5000, 5003, 5066, 8276, 8290, 9087, 9089
WALSCO #2512, 2525, 2528

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	High side thru .1mfd to Base of Converter transistor. Low side to chassis.	265KC (400% Mod.)	High end stop.	Across voice coil.	A1, A2, A3, A4	Adjust for maximum output.
2.	"	1610KC	"	"	A5	"
3.	Thru dummy (Fig. 1) to antenna receptacle.	"	"	"	A6, A7	Adjust for maximum output.
4.	With radio installed in car and antenna fully extended, tune in a weak station near 1000KC and adjust A7 for maximum output.					

PUSHBUTTON ADJUSTMENT

1. Pull Pushbutton out.
2. Tune manually to desired station.
3. Press Pushbutton in firmly.
4. Repeat for remaining Pushbuttons.

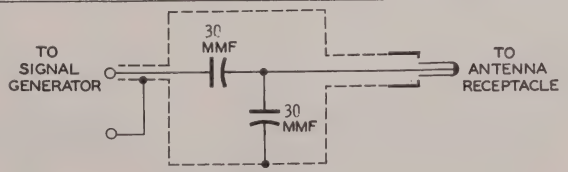


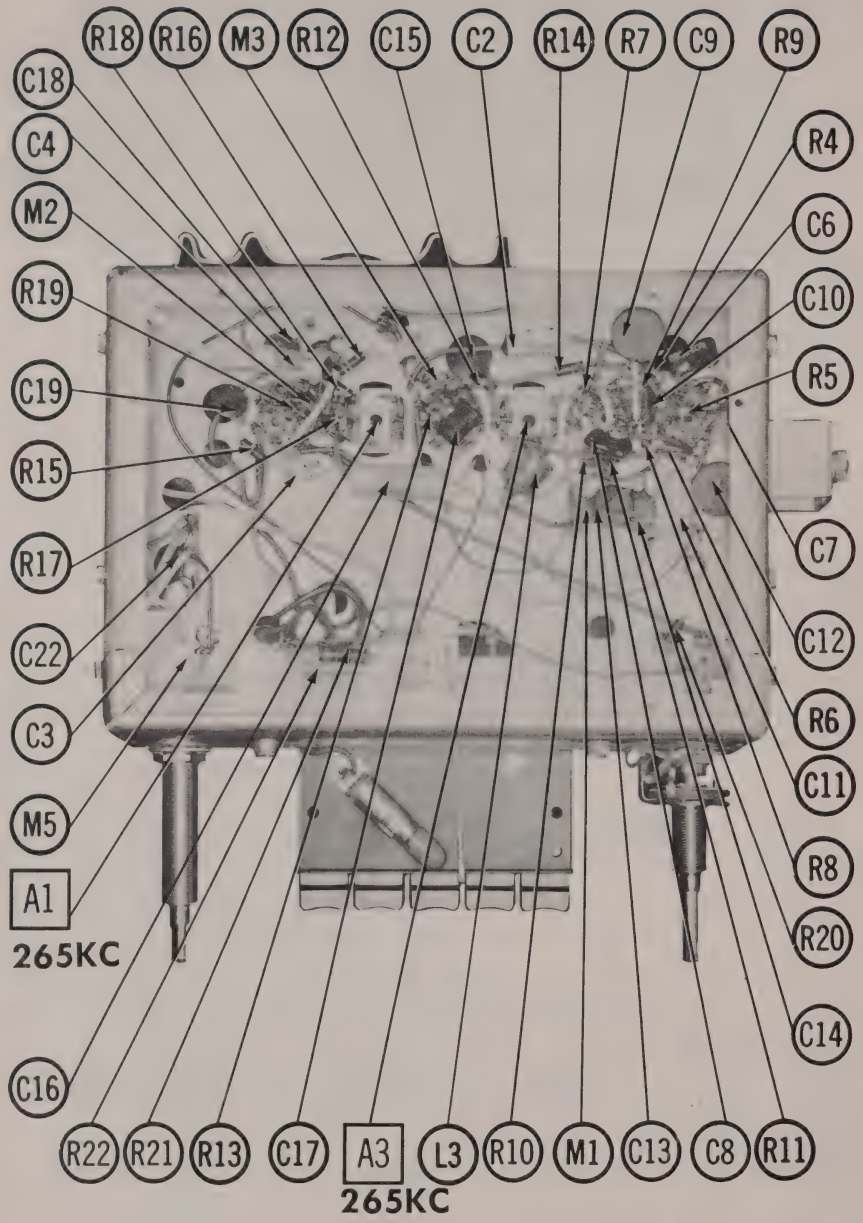
FIG. 1

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

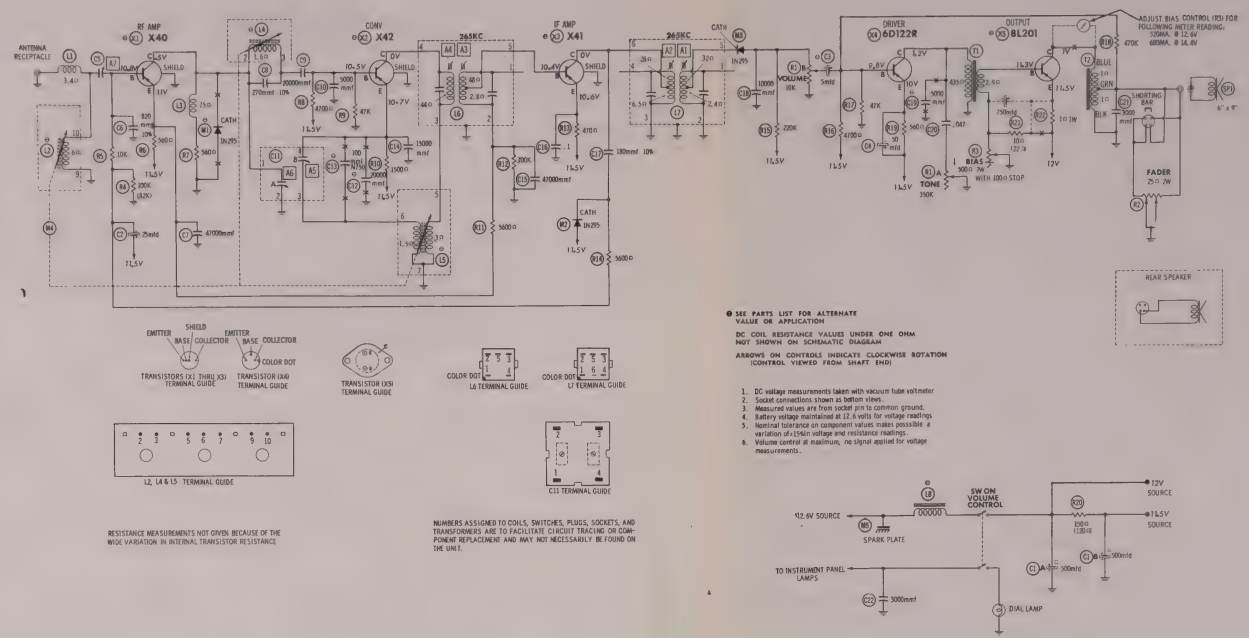
The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1961 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

KL358

SET 520 FOLDER 4



CHASSIS-BOTTOM VIEW


ANTENNA RECEPTACLE
RF AMP X1 X40
CONV X2 X42
265KC
IF AMP X3 X41
265KC
DRIVER X4 6D122R
OUTPUT X5 8L201
ADJUST BIAS CONTROL (R3) FOR FOLLOWING METER READING: 50MA. @ 12.6V 68OMA. @ 14.4V
VOLUME 10K
TONE 350K
BIAS 500Ω 7W WITH 100Ω STOP
FADER 25Ω 2W
SHORTING BAR
REAR SPEAKER
6" x 9"
CATH
1N295
SHIELD
EMITTER BASE COLLECTOR
TRANSISTORS (X1 THRU X5) TERMINAL GUIDE
TRANSISTOR (X6) TERMINAL GUIDE
TRANSISTOR (X5) TERMINAL GUIDE
COLOR DOT
L6 TERMINAL GUIDE
L7 TERMINAL GUIDE
L2, L4 & L5 TERMINAL GUIDE
C11 TERMINAL GUIDE
SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)
1. DC voltage measurements taken with vacuum tube voltmeter
2. Socket connections shown as bottom views.
3. Measured values are from socket pin to common ground.
4. Battery voltage maintained at 12.6 volts for voltage readings
5. Nominal tolerance on component values makes possible ± variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.
RESISTANCE MEASUREMENTS NOT GIVEN BECAUSE OF THE WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE
NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.
12.6V SOURCE
SPARK PLATE
SW ON VOLUME CONTROL
12V SOURCE
7.5V SOURCE
TO INSTRUMENT PANEL LAMPS
DIAL LAMP

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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AUTOMATIC MODEL ATC-60

PARTS LIST AND DESCRIPTIONS

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Shielded Hook-up Wire	Use BELDEN No. 8885
Bonding Strap	Use BELDEN No. 8661

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA			NOTES
			RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	X40 ①	RF Amplifier				PNP
X2	X42 ②	Converter				PNP
X3	X41 ③	IF Amplifier				PNP
X4	6D122R	Driver		2N362		PNP
X5	8L201	Output				PNP Note 1

Note 1. When replacing, apply silicon grease General Cement Part #8101 or equivalent between transistor and chassis. Tighten mounting screws securely and check bias adjustment.
① Alternate Type 2N640. ② Alternate Type 2N642. ③ Alternate Type 2N641.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	AUTOMATIC PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1A	■500	15	20-317	AFH3-00-95	B0040	WP200.6		TVLS-2157 *	
B	▲500	15							
C2	25	15	25-256	PTT15025	NLW25-15	TC26	ML25-15	TE-1157.1	
C3	5	15	20-505	PTT15005	NLW5-15	TT25X5	ML5-15	TE-1152	①
C4	50	15	20-506	PTT25050	NLW50-15	TT15X50	ML50-15	TE-1160	

① Some versions may use 10mfd@15V in this application.
* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C5		#28-800L						
C6	820 10%		1469-00082		5R5T82	CM-19B-820K	MCB251	MS-382
C7	47000		BPD-05	DD-503	CUB2S47	4DP-3-473	GP150	5HK-S50
C8	270 10%		1469-00027	TCZ-270	5R5T27	CM-19B-271K	CNO-327	MS-327
C9	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C10	5000		BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C11A		#28A1332						
B								
C12	20000	Note 1	BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20

FIXED CAPACITORS (cont)

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C13	100 N750	Note 1	N750-D1 100	DTN-100	C10T1U	CCTN-101	CN7-310	10TCU-T10
C14	15000		BPD-015	DD-153	BYA10S15	CCD-153	B-110	5HK-S10
C15	47000		BPD-05	DD-503	CUB2S47	4DP-3-473	GP150	5HK-S50
C16	.1 300V		P488N-1	DF-104	CUB4P1	4DP-3-104	GEM-401	4TM-P10
C17	180 10%		1469-00018	TCZ-180	22R5T18	CM-19B-181K	CNO-318	MS-318
C18	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C19	5000	Note 1	BPD-005	DD-502	BYA10D5	CCD-502	B-250	5HK-D50
C20	.047 200V		P288N-047	DD-503	CUB2S47	4DP-3-473	GEM-4147	4TM-S47
C21	3000		D1-3000	DD-302	BYA10D3	CCD-302	GP230	10TS-D30
C22	3000		D1-3000	DD-302	BYA10D3	CCD-302	GP230	10TS-D30

Note 1. Not used in some versions.
Automatic Part Number.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	AUTOMATIC PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R1A	350K		80A1330	F1-39		† QJ-1521A		Tone
B	10K			R2-23				Volume
C	Switch			KR-7				Power Off-On
D	Bushing			AK-28				
R2	25Ω	2(WW)	80A1086					Fader
R3	500Ω 100ΩStop	2(WW)	62-501		39-500-100	112-500-100	FL-600S	Bias

† "CONCENTRIKIT" equivalent: K-8 Kit with base elements & shafts: B13-132, P14-214 (Panel)
B11-116, R1-228 (Rear)
76-2 (Switch)
S32 (Bushing)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REPLACEMENT DATA			ITEM No.	RATING	REPLACEMENT DATA		
		IRC PART No.	WORKMAN TV PART No.	REMARKS			IRC PART No.	WORKMAN TV PART No.	REMARKS
R4	100K			(82K) *	R14	5600Ω			
R5	10K				R15	220K			
R6	560Ω				R16	4700Ω			
R7	560Ω				R17	47K			
R8	4700Ω				R18	470K			
R9	47K				R19	560Ω			
R10	1500Ω				R20	150Ω			(120Ω) *
R11	5600Ω				R21	10Ω			(22Ω) *
R12	100K				R22	1Ω 1W			
R13	470Ω								

* Alternate Value.

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA				NOTES
		AUTOMATIC PART No.	Merit PART No.	Miller PART No.	Stancor PART No.	
L1	RF Choke (6.2uh)	①	BC-565	4610	RTC-8520	① IRC Part #CL-1
L2	Ant.	②				② Part of M4
L3	RF Choke (10MH)		BC-553	4672	RTC-8534	
L4	RF	②				
L5	Osc.	②				
L6	Input IF	14-270				
L7	Output IF	14-271				

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA					NOTES
	CURRENT (Measured)	DC RES.	INDUCTANCE (0 CURRENT 1000 ∿)	AUTOMATIC PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
L8	.6A	.9Ω	.009 HY	75A601 ①					①Alternate Part # 75A6001

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO		REPLACEMENT DATA					NOTES
	PRI.	SEC.	AUTOMATIC PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	13	1	75A1303					

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE	REPLACEMENT DATA					NOTES
	PRI.	AUTOMATIC PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	20Ω Tap ⓐ 3-4Ω	75A1306					

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	AUTOMATIC PART No.	QUAM PART No.	
SP1	6"x 9"	PM	3-4Ω	73B1083	69A3	

SIGNAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA				NOTES
		AUTOMATIC PART No.	GENERAL ELECTRIC PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
M1	1N295	Note 1		1N295	1N295	1st Detector-Overload (Pigtail)
M2	1N295			1N295	1N295	2nd Detector (Pigtail)
M3	1N295			1N295	1N295	AVC (Pigtail)

Note 1. Not used in some versions.

MISCELLANEOUS

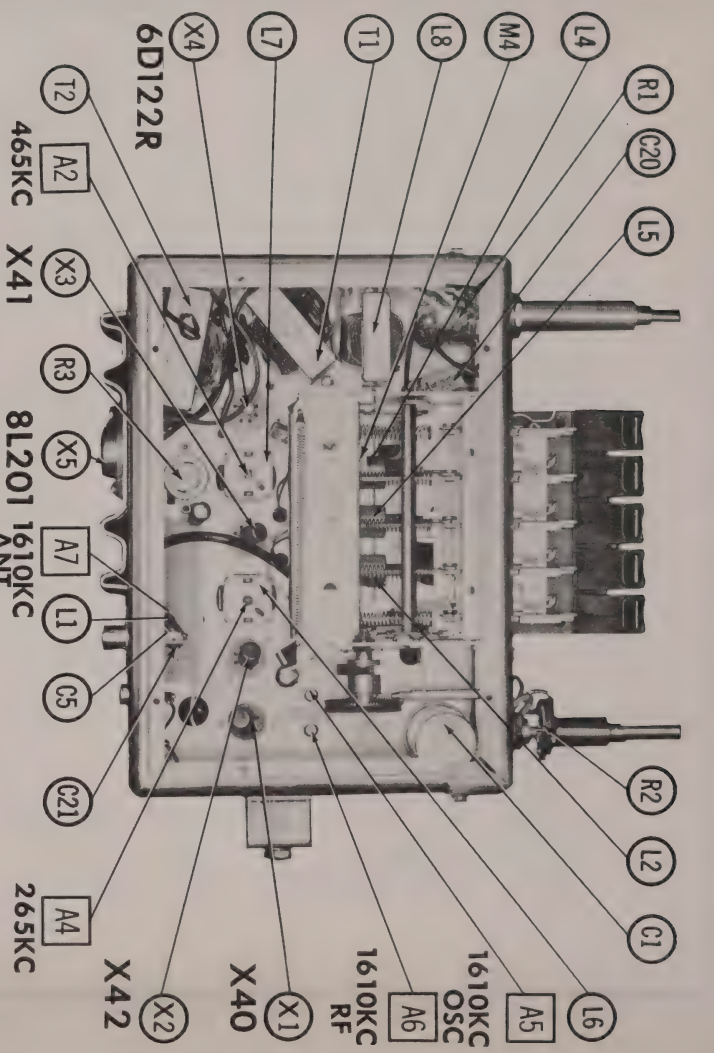
ITEM No.	PART NAME	AUTOMATIC PART No.	NOTES
M4	Tuner	78B1331	
M5	Spark Plate	43-215	

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	48A1069	Tuning, Volume, Dummy
Knob	48A1063	Tone, Fader

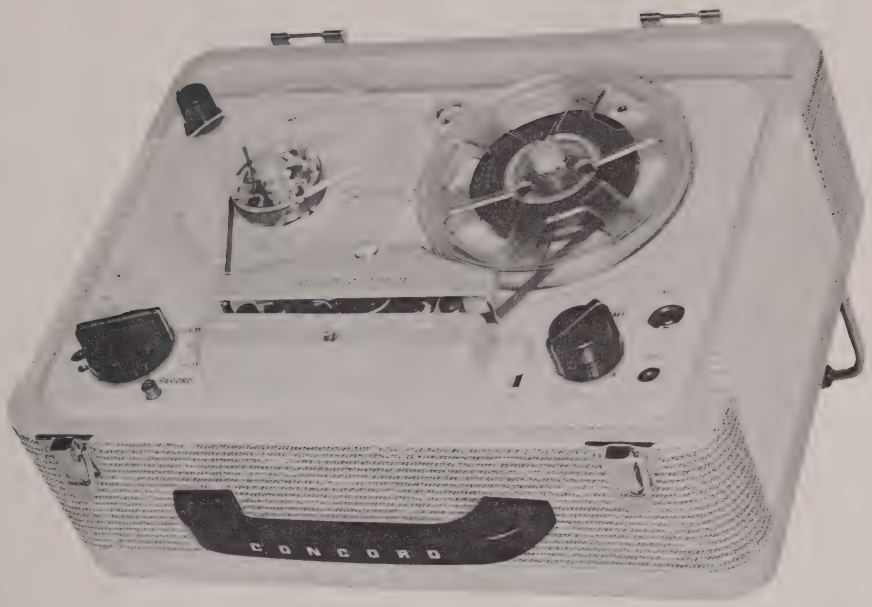
CHASSIS—TOP VIEW



PHOTOFACT® Folder

CONCORD AND HOSHO
MODEL 105

CONCORD AND HOSHO
MODEL 105



CONCORD AND HOSHO
MODEL 105

GENERAL INFORMATION

Concord Model 105 and Hosho Model 105 are two speed, dual track tape recorders.

Recordings can be made from a radio, phonograph, TV, magnetic cartridge, and from a crystal or ceramic cartridge.

A remote control switch is provided to start and stop the mechanism when it is being used for dictation.

The two tape speeds are 3 3/4 and 7 1/2 ips. The playing and recording times, using both tracks, are as follows:

Reel Size	3 3/4 ips	7 1/2 ips
5" (600 ft.)	1 hour	1/2 hour

These recorders are to be connected to an outlet supplying 110-120 volts, 60 cycles AC only. Severe damage will result if connected to a higher voltage or a direct current (DC) line.

Supplied By:

Concord Electronics Corp.
1549 North Vine Street
Hollywood, California

SET 520 FOLDER 5

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1961 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

CQ447

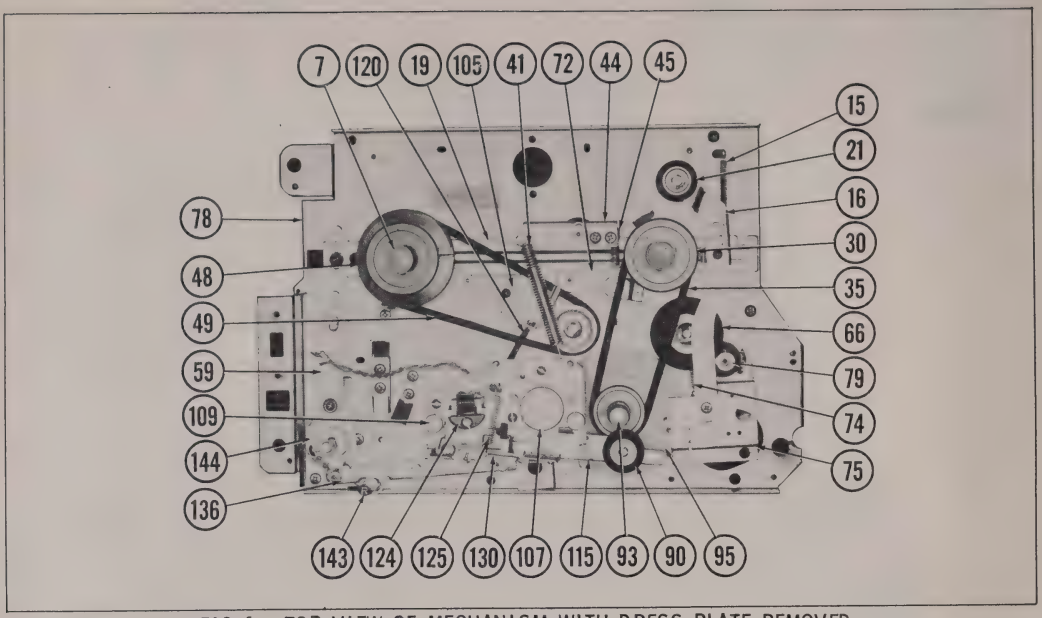


FIG.1 TOP VIEW OF MECHANISM WITH DRESS PLATE REMOVED

FUNCTION OF CONTROLS AND JACKS

On-Off-Volume

Turn this knob clockwise to turn the power on to the unit. Further rotation increases the volume during playback. When recording, it controls the recording level.

Selector

1. The tape motion is stopped when the Selector is in the Stop position.
2. Turning the Selector counterclockwise places the unit in Rewind position.
3. Turning the Selector clockwise from Stop position places the unit in play.
4. Turning the Selector clockwise from Play position places the unit in Record.

Fast Forward

Turn Selector to Play position and then pull the Fast Forward lever toward the front of the case to advance the tape rapidly.

Tone Control

Turn this control to the right to increase the treble. This control is operative only when Selector is in Play position.

Speaker Switch

When the switch is in the SP position, the recorder will play back through its built-in speakers. When the switch is in the EP Ext. position, it will play back through an external speaker or earphones.

Red "R" Button

Press down on the "R" button and turn the Selector to Record to make a recording. This is a safety lock to prevent the recorder from being put into the Record position and erasing a recording.

Speed Change

To change speed from 7 1/2 to 3 3/4 ips, remove head cover (4), knurled capstan screw (93), and lift 7 1/2 ips capstan (94) off and place on capstan holder.

E. P. Jacks

Earphones may be plugged into this jack for monitoring a recording or for listening to the playback of a recording.

"Ext." Output Jack

This jack is provided for playing the recorder through an external speaker, radio, or Hi Fi amplifier.

"Mic" Input Jack

This jack is used when making recordings with the microphone.

"Aux" Radio-Phono Input Jack

This jack is used when recording from a radio, phonograph, or TV.

Threading the Tape

1. Place a reel of tape on the left hand reel spindle (26).
2. Place an empty reel on the right hand reel spindle (26).
3. Unwind about 15" of tape from the reel. Hold a section taut and insert it in the tape slot. Make sure the dull-coated side faces the rear of the recorder.
4. Insert the free end of the tape into one of the radial slots in the right hand spindle reel. Turn the reel several turns counterclockwise to fasten the tape to the reel and to take up all slack between reels.

Microphone Recording

1. Rotate the On-Off-Volume control clockwise to turn the recorder on. Allow sufficient time for the tubes to warm up.
2. Insert the microphone plug into the "Mic" jack.
3. Set the speed for 3 3/4 or 7 1/2 ips.
4. Turn the Selector to the Record position.
5. Hold the microphone about 6 to 12 inches from your mouth and speak in a normal voice.
6. Adjust the volume control until the record indicator just closes on the loudest passages.

NOTE: Correct volume level on recording is very important. Too weak a signal will result in weak playback and high background noise. Too strong a signal will result in distortion during playback.

Recording from Radio, Phonograph, or TV

Connect the patch cord supplied with the recorder as follows:

1. Connect the alligator clips across the voice coil terminals of the radio, phonograph, or TV.
2. Insert the patch cord plug into the "Aux" jack.
3. Proceed as described under "Microphone Recording".

Cartridge Recording

1. Magnetic Cartridge:

   (a) Connect the output of the cartridge to a preamplifier.
   (b) Connect the preamplifier output to the "Aux" jack of the recorder.
   (c) Proceed as described under "Microphone Recording".

2. Crystal or Ceramic Cartridge:

   (a) Connect the cartridge leads to the "Aux" jack of the recorder.

   (b) Proceed as described under "Microphone" Recording".

Dual-Track Recording

In Dual-Track Recording, only one-half of the tape width is used in making a recording. After the first recording is completed, remove the full reel of tape, turn it over and place on the supply spindle. Thread the tape and proceed with the recording. The tape can be played back in the same manner.

Rewind

To rewind the tape at a rapid speed, turn the Selector to Rewind.

To Play a Recording

1. Thread the tape as described under "Threading the Tape".
2. Turn Selector to the Play position.
3. Adjust the volume to the desired listening level.

To Erase a Recording

Any recording on the tape is automatically erased before a new one is made when in the record position. To erase a recording without putting new material on the tape, follow the normal recording procedure, but set the volume control to the full counterclockwise position.

Fast Forward

Tape can be advanced rapidly by setting the Selector in Play position and then pull the "Fast" forward lever toward the front of the recorder.

Remote Control Switch

The Remote Control Switch plugs into the rear of the recorder. By setting the Selector in Play position, the tape can be started and stopped any time by depressing the button on the Remote Control Switch.

To Edit and Splice Tape

NOTE: It is impossible to edit and splice one track of a two-track tape without affecting the other. Recordings to be edited should be limited to one track tapes.

1. Tape may be edited by cutting out unwanted portions or by joining selection into another sequence. Announcements can be inserted between selections, etc. Unused tape can be spliced for reuse.
2. For best results, cut tape at a slight diagonal, butt ends together and fasten on the glossy side with splicing tape. Trim off any excessive width.

DISASSEMBLY

To Remove Recorder from Case

1. Remove all accessories from the recorder.
2. Remove all control knobs.
3. Remove head cover (4).
4. Remove the four panel retaining screws.
5. Lift the panel (8) off.
6. Remove four screws from bottom of case.
7. Lift recorder out of case.
8. Unplug the speaker plug from the amplifier chassis.
9. To reassemble, reverse the foregoing procedure.

ADJUSTMENTS

Record-Playback Head

1. Thread a standard frequency tape on the recorder.
2. Adjust the head mounting screws for the angular position that will give maximum output while playing a section of the tape with more than 7,000 cps.
3. Tighten the mounting screws.

Drive Idler

1. Fasten a string around the oil cup of drive idler (66).
2. Fasten a spring scale to the string and measure the force necessary to pull drive idler (66) away from the motor pulley (79) and flywheel of capstan (95).
3. A force of 1 1/4 to 1 5/8 pounds is required.
4. To obtain this force, bend the metal lug that drive idler tension spring (74) is fastened to.

Pressure Roller

To vary the pressure of the pressure roller, pressure roller arm tension spring will have to be adjusted by varying the gap between the coils of the spring. The pressure should be from 2 5/8 to 3 3/8 pounds.

Takeup Torque

The takeup torque is adjusted by varying friction spring (33). It should be adjusted so the upper limit is between 1.3 — 2.1 oz. inches.

CLEANING

The record head, erase head, capstan, pressure roller, and tape guides should be cleaned occasionally to remove the tape residue which is worn off the tape as it passes these parts. Use a soft cloth and alcohol to remove the residue.

Clean the rubber tired idler wheels and belts with cleaning fluid.

LUBRICATION

All rotating parts are provided with oilite bearings and are lubricated before leaving the factory. Under normal use, no lubrication is required for a long period of time. When lubrication is necessary, use sewing machine oil sparingly.

When lubricating the flywheel, remove the capstan screw and inject 4 or 5 drops of sewing oil.

TROUBLE CHART

Symptom	Cause	Remedy
Weak output.	1. Record-playback head (107) not properly aligned.	1. See "Head Adjustment".
	2. Pressure pad (126) not contacting the head properly.	2. If pressure pad is worn, replace. If spring (125) is broken, replace.
	3. Record-playback head (107) defective.	3. Replace.
No takeup reel drive in "Record" or "Play" position.	1. Takeup drive belt (35) broken.	1. Replace.
	2. Brake assembly (44) does not open.	2. Adjust or replace brake assembly (44).
	3. Coupling between takeup drive pulley (34) and takeup hub (30) too loose.	3. Adjust friction disc (32).
	4. Takeup hub (30) or takeup drive pulley (34) does not rotate freely.	4. Lubricate with sewing machine oil.

TROUBLE CHART (CON'T.)

Symptom	Cause	Remedy
Incomplete or no erase.	1. Erase head (124) is not properly aligned. 2. Erase head (124) defective. 3. Defective erase head circuit.	1. Adjust the erase head. 2. Replace 3. Check circuit components.
Runs slow in fast forward position.	1. Fast forward roller (21), takeup hub (30), or rewind hub (48) dirty. 2. Tape guide posts dirty. 3. Contact between fast forward roller (21) and takeup hub (30) or takeup drive pulley (34) not sufficient.	1. Remove these parts, clean, lubricate, and reassemble. 2. Clean posts with a soft cloth and alcohol. 3. Clean all contacting surfaces or adjust so they make proper contact.
Wow or Flutter.	1. Play-record head (107), erase head (124), pressure pads (126) and (129), or tape guide post (109) dirty. 2. Motor pulley (79), drive idler wheel (66), capstan flywheel (95), or pressure roller (90) coated with foreign matter. 3. Capstan screw loose. 4. Rotating parts binding. 5. Drive idler wheel (66) or pressure roller (90) has flat spots formed on them. 6. Tape dirty.	1. Clean these parts with a soft cloth and alcohol. 2. Clean the surface of these parts with a cloth dampened with alcohol. 3. Tighten screw. 4. Clean any binding rotating parts and lubricate 5. Replace drive idler wheel (66) or pressure roller (90). 6. Replace the tape.
Motor (82) will not run.	1. Motor (82) defective. 2. Loose connection.	1. Replace motor (82). 2. Check motor leads for cold solder joints.
Takeup hub (30) binds in rewind position.	1. Coupling is too close between takeup drive pulley (34) and takeup hub (30).	1. See "Takeup Torque Adjustment".
No drive in rewind position.	1. Rewind drive belt (49) broken. 2. Spring (120) broken or disconnected. 3. Foreign matter on capstan flywheel (95) and rewind drive pulley (104). 4. Rewind drive pulley (104) or rewind hub (48) binding.	1. Replace rewind drive belt (49). 2. Replace or reconnect spring (120). 3. Clean with alcohol. 4. Lubricate with sewing machine oil.

MECHANICAL PARTS LIST

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
1		Head Cover Retainer Screws	13		Fast Forward Slide Retaining Screw
2		Head Cover Retainer Clips	14		Lock Washer
3		Head Cover Retainer	15	A70057	Fast Forward Tension Spring
4	A81125	Head Cover A-L	16	A64951	Fast Forward Slide
5		Fast Forward Knob	17		Belt Guide
6	A87050-A or A87050	Volume Control Knob - K Volume Control Knob	18		Spacer
			19	A64957-B	Selector Slide
			20		Washer
7		Reel Holders	21	A48093	Fast Forward Roller -L
8	A81029-E	Panel	22	A85181	Oil Fabric Washer
9		"C" Washer	23	A85182	Felt Washer
10	A67448	Fast Forward Roller Shaft	24		Lockwasher
11	A65199	Oil Case	25		Hex Nut
12	A85181	Oil Fabric Washer	26	A67397	Reel Spindle

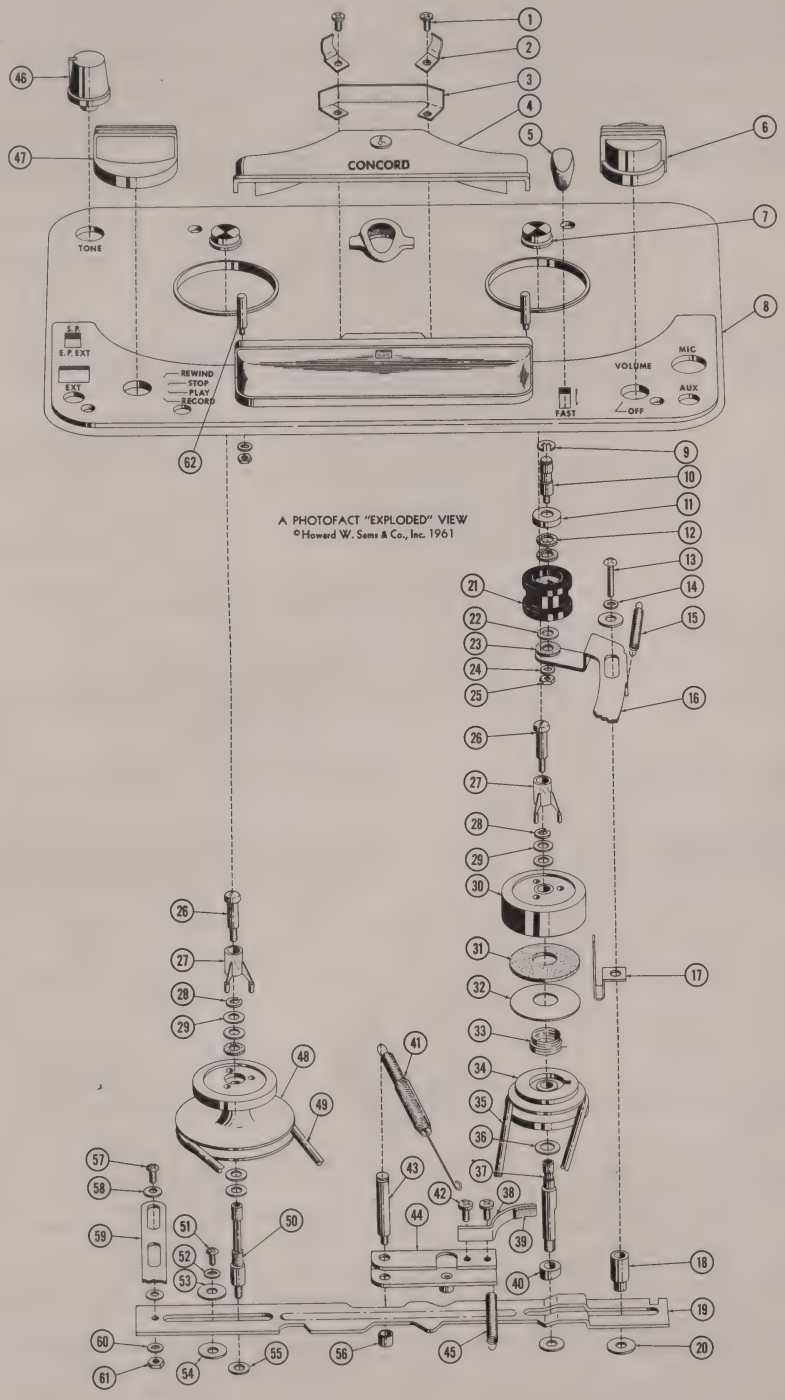


FIG. 2A EXPLODED VIEW OF PARTS BELOW DRESS PLATE

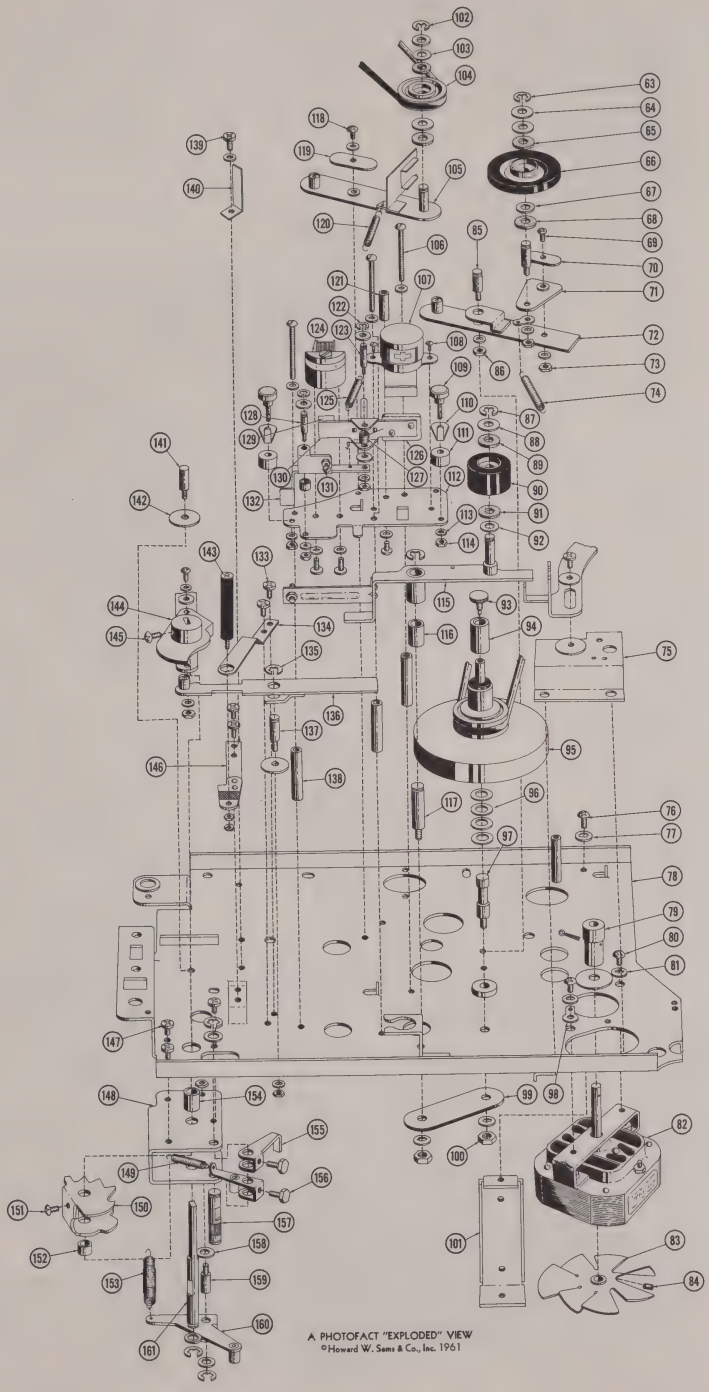


FIG. 2B EXPLODED VIEW OF PARTS ABOVE BASE PLATE

MECHANICAL PARTS LIST (CON'T.)

Ref. No.	Part No.	Description
27	A81055	Ridged Sleeve
28		Spring Washer
29		Washer
30	A81059-B	Take-up Hub
31	A85151	Friction Felt
32	A64887	Friction Disc
33	A70048	Friction Disc and Spring
34	A81060	Take-up Drive Pulley
35*	*A83027-B	*Take-up Drive Belt
36	A85186	Oil Fabric Washer
37	A67398	Take-up Hub Shaft
38		Brake Arm
39		Brake Pad
40	A67396	Stepper
41	A70073B	Pressure Roller Arm Tension Spring
42		Brake Arm Mounting Screws
43		Brake Assembly Shaft
44	A64960	Brake Assembly
45		Brake Assembly Tension Spring
46	A87051-A	Tone Control Knob-K (Green)
	A87051	Tone Control Knob (Beige)
47	A87049-A	Selector Control Knob-K (Green)
	A87049	Selector Control Knob (Beige)
48	A43094	Rewind Hub
49*	*A83028-B	*Rewind Drive Belt
50	A67651	Rewind Hub Shaft
51		Selector Slide Mounting Screw
52		Lock Washer
53		Washer
54		Fiber Washer
55		Washer
56		Spacer
57		Selector Lever Mounting Screw
58		Fiber Washer
59	A64792-B	Selector Lever
60		Lock Washer
61		Hex Nut
62		"C" Washer
63		Spring Washer
64		Felt Washer
65		Oil Fabric Washer
66	A67414-B	Drive Idler
67		Felt Washer
68		Oil Fabric Washer
69		Screw (Hex Hd.)
70		Plate
71		Drive Idler Mounting Plate
72	A64795-B	Drive Idler Arm
73		Hex Nut
74		Drive Idler Tension Spring
75		Fast Forward Slide Mounting Brkt.
76		Screw
77		Lock Washer
78		Baseplate
79		Motor Pulley
80		Motor Mounting Screws
81		Lock Washer
82	A48055	Motor
83		Motor Fan
84		Fan Set Screw
85		Drive Idler Arm Shaft
86		Hex Nut
87		"C" Washer
88		Spring Washer
89		Oil Fabric Washer
90	A48031-B	Pressure Roller
91		Oil Fabric Washer
92		Washer

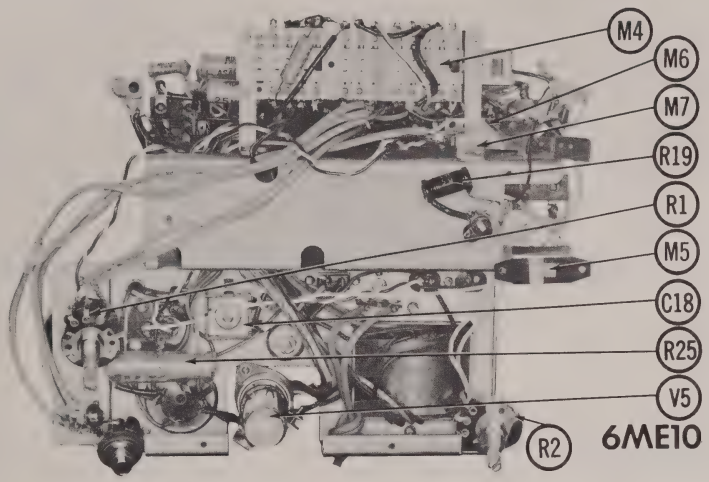
Ref. No.	Part No.	Description
93		Capstan Screw
94		7 1/2 Ips Capstan
95	A48059-A	Capstan
96		Oil Fabric Washer
97		Capstan Shaft
98		Lug
99		Stiffing Plate
100		Hex Nut
101		Mounting Bracket
102		"C" Washer
103	A85181	Oil Fabric Washer
104	A48090	Rewind Drive Pulley
105	A64955	Rewind Drive Pulley Arm
106		Head Assembly Mounting Screw
107	A46017	Record-Playback Head
108		Record-Playback Head Mtg. Screw
109	A67446	Tape Guide Post
110	A67449	Tape Guide Post
111	A64950	Spacer
112		Record-Playback and Erase Head Mounting Plate
113		Lock Washer
114		Hex Nut
115	A64958-B	Pressure Roller Arm
116		Spacer
117		Pressure Roller Arm Shaft
118		Screw
119		Plate
120	A70057	Rewind Drive Pulley Arm Tension Spring
121		7 1/2 Ips Capstan Storage Post
122		"C" Washer
123		Pressure Pad Assembly Shaft
124	A46017	Erase Head
125		Pressure Pad Tension Spring
126	A85153	Pressure Pad
127		Pressure Pad Tension Spring (Coil)
128		Pressure Pad Arm Shaft
129	A85153	Pressure Pad
130		Pressure Pad Assembly
131		Pressure Pad Adjusting Screw
132		Pressure Pad Actuating Arm
133		Screw
134	A64947	Record Lock Button Protector
135		"C" Washer
136	A64794-C	Pressure Roller Arm Hold-out Lever
137		Pressure Roller Arm Hold-out Lever Shaft
138		Spacer
139		Screw
140		Rewind Belt Guide
141		Selector Lever Pivot
142		Washer
143	A81069-B	Record Lock Button
144	A67463	Selector Cam
145		Set Screw
146		Record Lock
147		Screw
148		Switch Cam Selector Mounting Brkt.
149		Switch Lever Tension Spring
150		Switch Cam Selector
151		Set Screw
152		Spacer
153		Tension Spring
154		Spacer
155		Switch Lever
156		Set Screw

Ref. No.	Part No.	Description
157		Switch Lever Shaft
158		Fiber Washer
159		Detent Lever Shaft

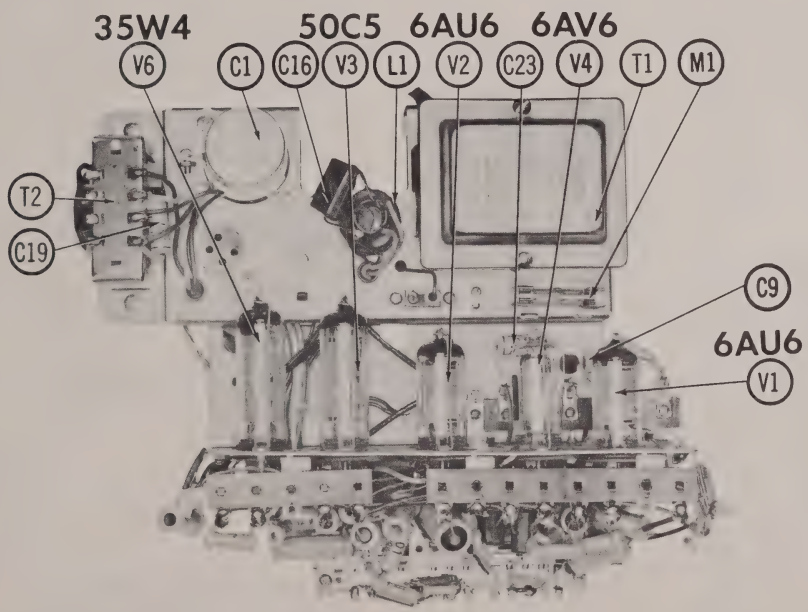
* Rewind Drive Belt
Walsco Part No. 1410-10

Ref. No.	Part No.	Description
160		Detent Lever
161		Function Selector Shaft

* Take-up Drive Belt
Walsco Part No. 1474



AMP CHASSIS-SIDE VIEW



AMP CHASSIS-TOP VIEW

ELECT. PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V1	Preamplifier	6AU6	V4	Level Ind. Amp.-Rect.	6AV6
V2	AF Amplifier	6AU6	V5	Level Indicator	6ME10
V3	Output-Bias Oscillator	50C5	V6	Rectifier	35W4

• GENERAL ELECTRIC • RAYTHEON • SYLVANIA •

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA CONCORD PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	60	150	A25103			FP311.6	TMT-3130		
B	40	150							
C	3	150							
C2	5	150		SRE150V5	NLW5-150	TC40	MLV5-150	TE-1504	
C3	5	150		SRE150V5	NLW5-150	TC40	MLV5-150	TE-1504	
C4	20	10		PTT10020	NLW20-15	TT15X20	MLV20-12	TE-1130	
C5	20	10		PTT10020	NLW20-15	TT15X20	MLV20-12	TE-1130	
C6	25	25		PTT25025	NLW25-25	TT25X25	MLV25-25	TE-1207	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C7	.1 400V		P488N-1	DF-104	CUB4P1	4DP-3-104	GEM-401	4TM-P10
C8	100 10%		1469-0001	TCZ-100	22R5T1	CM-19B-101K	MCB235	MS-31
C9	.022 400V		P488N-022	DD-203	CUB4S22	4DP-2-223	GEM-4122	4TM-S22
C10	.01 400V		P488N-01	D6-103	CUB4S1	4DP-1-103	GEM-411	4TM-S10
C11	.01 400V		P488N-01	D6-103	CUB4S1	4DP-1-103	GEM-411	4TM-S10
C12	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C13	330 10%		1469-00033		5R5T3	CM-19B-331K	MCB241	MS-333
C14	100 10%		1469-0001	TCZ-100	22R5T1	CM-19B-101K	MCB235	MS-31
C15	.01 400V		P488N-01	D6-103	CUB4S1	4DP-1-103	GEM-411	4TM-S10
C16	10000 5%				10R5S1	VCM-35B-103J	MCE475	MS-11
C17	.1 400V		P488N-1	DF-104	CUB4P1	4DP-3-104	GEM-401	4TM-P10
C18	50-300					465		
C19	.01 400V		P488N-01	D6-103	CUB4S1	4DP-1-103	GEM-411	4TM-S10
C20	.01 400V		P488N-01	D6-103	CUB4S1	4DP-1-103	GEM-411	4TM-S10
C21	3300 10%		1469-0033		1R5D33	CM-20B-332K	MCJ462	MS-233
C22	1000 5%		1469-001		5R5D1	CM-19B-102J	MCJ255	MS-21
C23	.01 400V		P488N-01	D6-104	CUB4S1	4DP-1-103	GEM-411	4TM-S10
C24	.01 400V		P488N-01	D6-104	CUB4S1	4DP-1-103	GEM-411	4TM-S10

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA CONCORD PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500K	½	A36501					Volume
B	Switch							Power Off-On
R2	20K		A36016					Tone

AMP CHASSIS—BOTTOM VIEW

ELECT. PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REPLACEMENT DATA		
		IRC PART No.	WORKMAN TV PART No.	REMARKS
R3	470K			
R4	100K 2W			
R5	270K 2W			
R6	1200Ω			
R7	10K 1W			
R8	100K 2W			
R9	270K 2W			
R10	1200Ω			
R11	220Ω			
R12	8200Ω			
R13	1200Ω			
R14	470K			

ITEM No.	RATING	REPLACEMENT DATA		
		IRC PART No.	WORKMAN TV PART No.	REMARKS
R15	3300Ω 2W			
R16	180Ω 2W			
R17	56K			
R18	220K			
R19	5Ω 1W			
R20	4.7meg			
R21	270K			
R22	1meg			
R23	7meg			
R24	1meg			
R25	150Ω 2W			

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA				NOTES
		CONCORD PART No.	Merit PART No.	Miller PART No.	Stancor PART No.	
L1	Oscillator					

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA					NOTES
	PRI.	SEC. 1	SEC. 2	CONCORD PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	117V @ .27A Tap @ 100V (Not Used) Tap @ 85V @ .150A	120V @ .040A DC	6.3VCT @ 1.8A	A11013					

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA					NOTES
	PRI.	SEC.	CONCORD PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	2500Ω	4-5Ω	A12136	A-3025①	A-3332①	26S58①	S-1X①	① Drill New Mounting Hole (s).

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	CONCORD PART No.	QUAM PART No.	
SP1	3½"	PM	8-10Ω	A45192	3A07Z8	
SP2	3½"	PM	8-10Ω	A45192	3A07Z8	

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			CONCORD PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG	¼A 250V			312005 (3AG 1¼A 250V)	357001	AGC ½	4405

MISCELLANEOUS

ITEM No.	PART NAME	CONCORD PART No.	NOTES
M2	Head	A46017	Record-Playback
M3	Head	A46018	Erase
M4	Switch	A42519	Selector (Slide Type)
M5	Switch	A42200	Speaker (DPDT Slide Type)
M6	Switch	A42518	Speaker (Leaf Type)
M7	Switch	A42517-B	Motor (Leaf Type)
	Motor	A48055	Drive

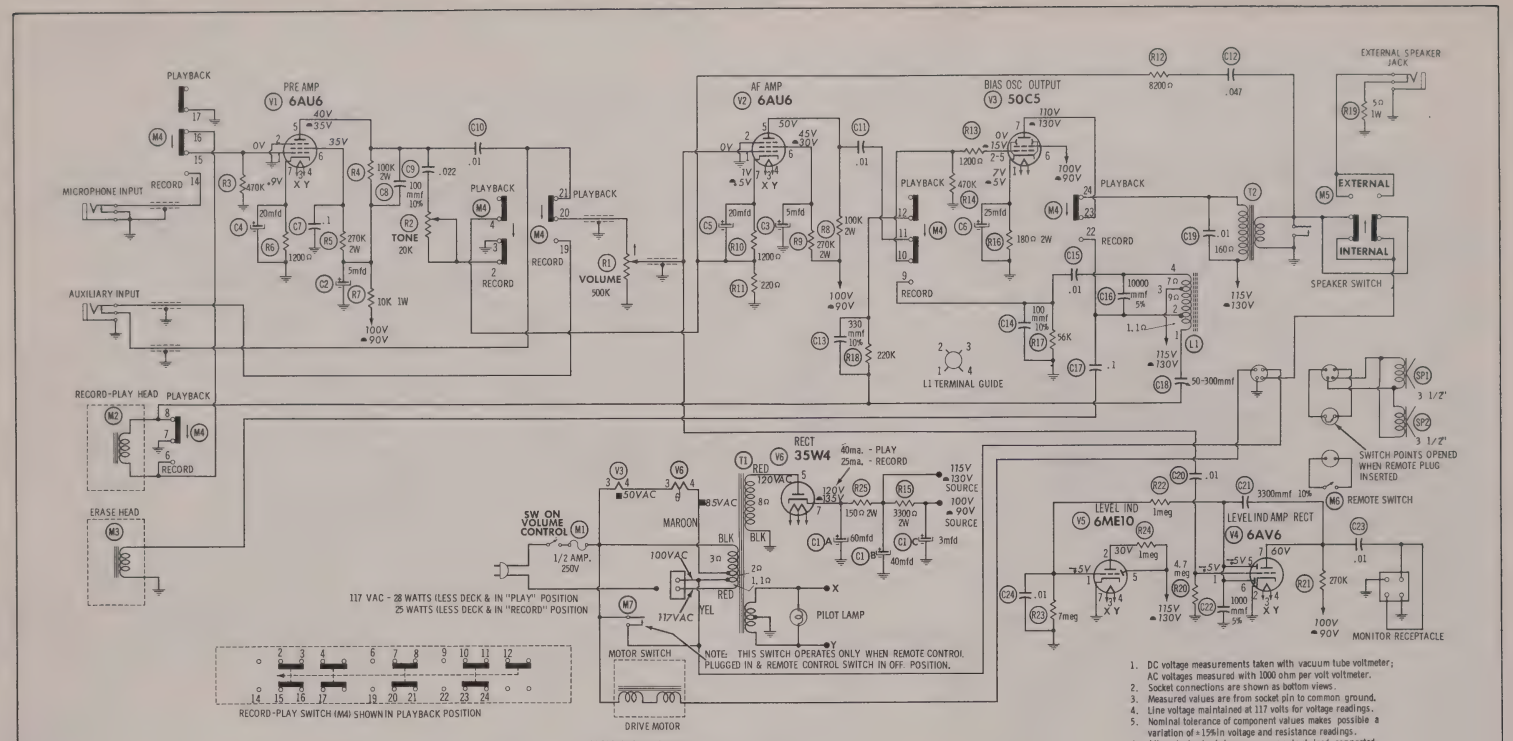
CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	A87050A	Volume, Model 105K
Knob	A87050	Volume, Model 105L
Knob	A87049A	Selector, Green, Model 105K
Knob	A87049	Selector, Beige, Model 105L
Knob	A87051A	Tone, Green, Model 105K
Knob	A87051	Tone, Beige, Model 105L
Knob	A87027B	Fast Forward
Pushbutton	A81069B	Record
Cabinet	A84053B	Green, Model 105K
Cabinet	A84053C	Beige, Model 105L

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No.	8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No.	1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No.	8401
Phono Pick-up Arm Cable	Use BELDEN No.	8430 (Two Conductor - Twisted)



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	6AU6	470K ▪0Ω	0Ω	.1Ω	.1Ω	†110K	†280K	1200Ω
V2	6AU6	0Ω	0Ω	.1Ω	.1Ω	†100K	†270K	1400Ω ▪1200Ω
V3	50L5	180Ω	470K ▪50K	▪0Ω	▪30Ω	NC	†3300Ω	†310Ω ▪†150Ω
V4	6AV6	4.7meg	0Ω	.1Ω	.1Ω	8meg	8meg	†270K
V5	6ME10	7meg	†1meg	.1Ω	.1Ω	†150Ω	NC	0Ω
V6	35W4	NC	NC	▪30Ω	▪20Ω	8Ω	NC	¶

ALL MEASUREMENTS MADE IN "PLAY" POSITION UNLESS OTHERWISE DESIGNATED, LESS DECK.
▬ MEASURED IN "RECORD" POSITION.
■ MEASURED FROM SWITCH SIDE OF AC LINE.
† MEASURED FROM PIN 7 OF V6.
NC NO CONNECTION
¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured with 1000 ohm per volt voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common ground.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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CONCORD AND HOSHO
MODEL 105

PHOTOFACT® Folder with CIRCUITRACE®

DUMONT MODEL RA-410B (CH. 120481-B)

DUMONT MODEL
RA-410B (CH. 120481-B)

DUMONT MODEL
RA-410B (CH. 120481-B)

TRADE NAME	Dumont Model RA-410B (Belladier) (Ch. 120481-B)
MANUFACTURER	Dumont Television & Radio Corp., 14th & Coles Streets, Jersey City, N. J.
TYPE SET	AC Operated 3 Tube Stereo Phono Amplifier With 4 Speed Automatic Record Changer
POWER SUPPLY	110 – 120 Volts AC, 60 Cycles RATING 34 Watts, .44 Amp. @117 Volts AC (Less Motor)

FOR SERVICE INFORMATION ON RECORD CHANGER PART #819142 – SEE SIMILAR WEBCOR 171 – PHOTOFACT SET 447 FOLDER 13 OR RECORD CHANGER MANUAL RC-12

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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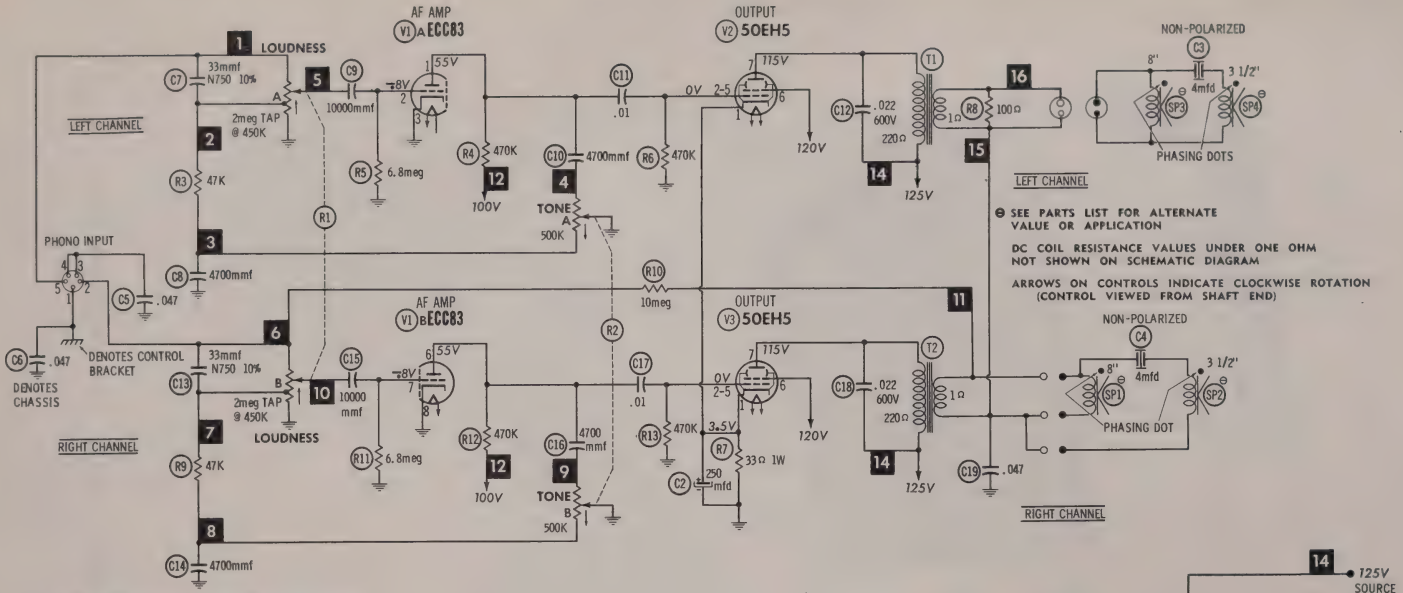

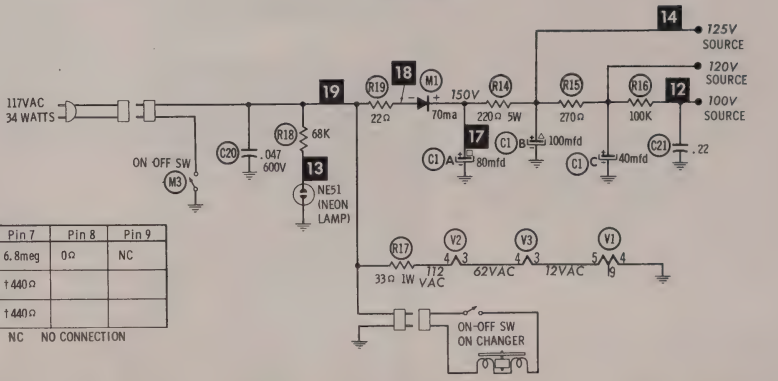

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured with 1000 ohm per volt voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common ground.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	ECC83 12AX7	†570K	6.8meg	0Ω	0Ω	10Ω	†570K	6.8meg	0Ω	NC
V2	50EH5	33Ω	470K	60Ω	120Ω	NC	†500Ω	†440Ω		
V3	50EH5	33Ω	470K	10Ω	60Ω	470K	†500Ω	†440Ω		

† MEASURED FROM OUTPUT OF M1. NC NO CONNECTION

A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUITRACE

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DUMONT MODEL RA-410B (CH. 120481-B)

PARTS LIST AND DESCRIPTIONS

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No. 1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No. 8401
Phono Pick-up Arm Cable	Use BELDEN No. 8430 (Two Conductor - Twisted)

TUBES

ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
	◆ GENERAL ELECTRIC ◆			RAYTHEON ◆ SYLVANIA ◆	
V1	Left Channel AF Amp. - Right Channel AF Amp.	ECC83/12AX7	V2 V3	Left Channel Output Right Channel Output	50EH5 50EH5

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA DUMONT PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	■80	160	925470					PCLS-3447.2*	
B	▲100	160							
C	40	160							
C2	250	15	925461	PRS1210	BR2501	TC50025	TD-250-15	TVA-1160	
C3	4	15NP	925391	PRS7405	BBR4-150	TCN504		TVANS-1150 *	
C4	4	15NP	925391	PRS7405	BBR4-150	TCN504		TVANS-1150 *	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C5	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C6	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C7	33 N750 10%		N750-DI 33	DTN-33	C10Q33U	CCTN-330	CN7-433	10TCU-Q33
C8	4700		BPD-0047	DD-472	BYA10D47M	CCD-472	B-247	5HK-D47
C9	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C10	4700		BPD-0047	DD-472	BYA10D47M	CCD-472	B-247	5HK-D47
C11	.01 400V		P488N-01	D6-103	CUB4S1	4DP-1-103	GEM-411	4TM-S10
C12	.022 600V		P688N-022	DD-203	CUB6S22	6DP-2-223	GEM-6122	6TM-S22
C13	33 N750 10%		N750-DI 33	DTN-33	C10Q33U	CCTN-330	CN7-433	10TCU-Q33
C14	4700		BPD-0047	DD-472	BYA10D47M	CCD-472	B-247	5HK-D47
C15	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C16	4700		BPD-0047	DD-472	BYA10D47M	CCD-472	B-247	5HK-D47
C17	.01 400V		P488N-01	D6-103	CUB4S1	4DP-1-103	GEM-411	4TM-S10
C18	.022 600V		P688N-022	DD-203	CUB6S22	6DP-2-223	GEM-6122	6TM-S22
C19	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C20	.047 600V		P688N-047	DD-503	CUB6S47	6DP-3-473	GEM-6147	6TM-S47
C21	.22 400V		P488N-22		CUB4P22	6DP-3-224	GEM-4022	4TM-P22

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA DUMONT PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	2meg	½	390583	BT-175 *				Loudness, Left Channel
	450K Tap							
B	2meg	½		STR-175 *				Loudness, Right Channel
	450K Tap							
R2A	500K	½	390589	B-59	AD47-500K-S		FA55L	Tone, Left Channel
B	500K	½		SR-59	Not Req.		RU55L	Tone, Right Channel
C	Shaft			Not Req.	FS-3		CS3500	

* Use AK-32 Stereo Friction Spring.
Do not use Tap #2.

PRINTED BOARD

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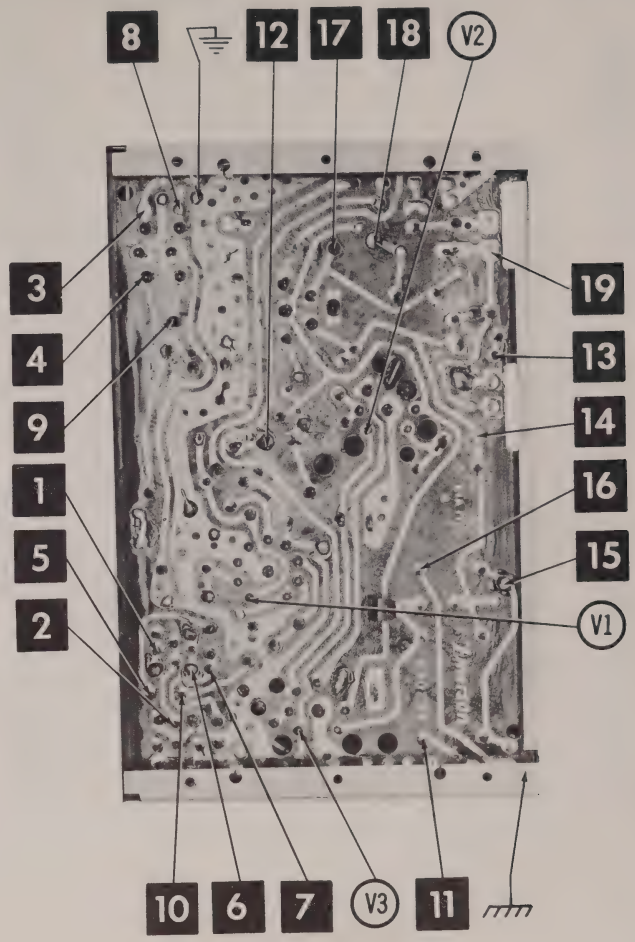
ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS (IRC or EQUIVALENT)

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R3	47K	
R4	470K	
R5	6.8meg	
R6	470K	
R7	33Ω 1W	
R8	100Ω	

ITEM No.	RATING	REMARKS
R9	47K	
R10	10meg	
R11	6.8meg	
R12	470K	
R13	470K	
R14	220Ω 5W	IRC#PW5-220Ω

ITEM No.	RATING	REMARKS
R15	270Ω	
R16	100K	
R17	33Ω 1W	
R18	68K	
R19	22Ω	Pt. #397133

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA					NOTES
	PRI.	SEC.	DUMONT PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	3300Ω	6-8Ω	734181	A-2902①	A-2203①	24S06 ①	S-53X①	① Use Original Frame.
T2	3300Ω	6-8Ω	734181	A-2902①	A-2203①	24S06①	S-53X①	

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	DUMONT PART No.	QUAM PART No.	
SP1	8"	PM	6-8Ω	220915 *	8A21Z6.2	* Alternate Part #220903
SP2	3½"	PM	6-8Ω	518-907 †	3A15TZ5.8	† Alternate Part #218902
SP3	8"	PM	6-8Ω	220915 *	8A21Z6.2	
SP4	3½"	PM	6-8Ω	518-907 †	3A15TZ5.8	

POWER RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA				NOTES
	CURRENT (Measured)	DUMONT PART No.	RCA PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	
M1	.070A	817079 *	1N1763 *	2F4 *	SR200 *	* Silicon Type

PHONO CARTRIDGE & NEEDLES

*NEEDLE LISTINGS SHOWN ARE FOR RESPECTIVE REPLACEMENT CARTRIDGES ONLY.

ITEM No.	REPLACEMENT DATA								NOTES
	DUMONT PART No.		ASTATIC PART No.		ELECTRO-VOICE PART No.		SONOTONE PART No.		
	CARTRIDGE	NEEDLE*	CARTRIDGE	NEEDLE*	CARTRIDGE	NEEDLE*	CARTRIDGE	NEEDLE*	
M2	962326	Not Req.	13T	Not Req.	13	Not Req.	10T2-S	Not Req.	

MISCELLANEOUS

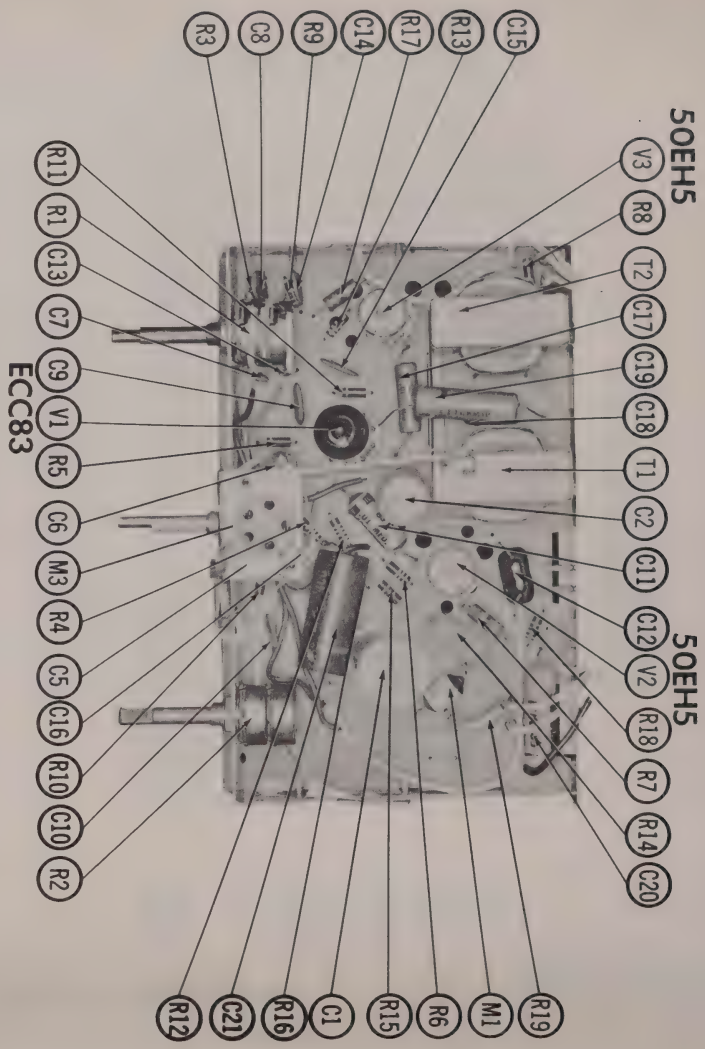
ITEM No.	PART NAME	DUMONT PART No.	NOTES
M3	Switch	510149	Off-On

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	461093	Volume, Outer
Knob	461094A	Volume, Inner
Knob	461095A	Tone
Knob	461108A	Selector

CHASSIS—TOP VIEW



PHOTOFACT® Folder with CIRCUITRACE®

**JEFFERSON-TRAVIS
MODEL JT-D210**

JEFFERSON-TRAVIS
MODEL JT-D210

JEFFERSON-TRAVIS
MODEL JT-D210

TRADE NAME	Jefferson-Travis Model JT-D210
SUPPLIER	Jefferson-Travis, Inc., Subsidiary of Emerson Radio & Phonograph Corp., 524 W. 23rd Street, New York 11, N. Y.
TYPE SET	Battery Operated Transistorized Portable AM Receiver
POWER SUPPLY	9 Volts DC
RATING	11MA@9 Volts DC (Min.-Max. Volume)
TUNING RANGE—BROADCAST	540 — 1600KC

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested Alignment Tools: A4 and A6...GENERAL CEMENT #5000, 5003, 5066, 8271, 8272, 8276, 8277, 8290, 8609, 8722, 9150, 9298

WALSCO #2515, 2516, 2518, 2519, 2525, 2541

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	High side thru .1mfd to antenna stator lug of tuning gang. Low side to chassis.	455KC (400~ Mod.)	Tuning gang fully open.	Across voice coil.	A1, A2	Adjust for maximum output.
2.	Loop	525KC	Tuning gang fully closed.	"	A3	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.	"	1650KC	Tuning gang fully open.	"	A4	"
4.	"	630KC	630KC Signal.	"	A5	"
5.	"	1400KC	1400KC Signal.	"	A6	Adjust for maximum output. Repeat Steps 2 thru 5.

SET 520 FOLDER 7

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of KF266

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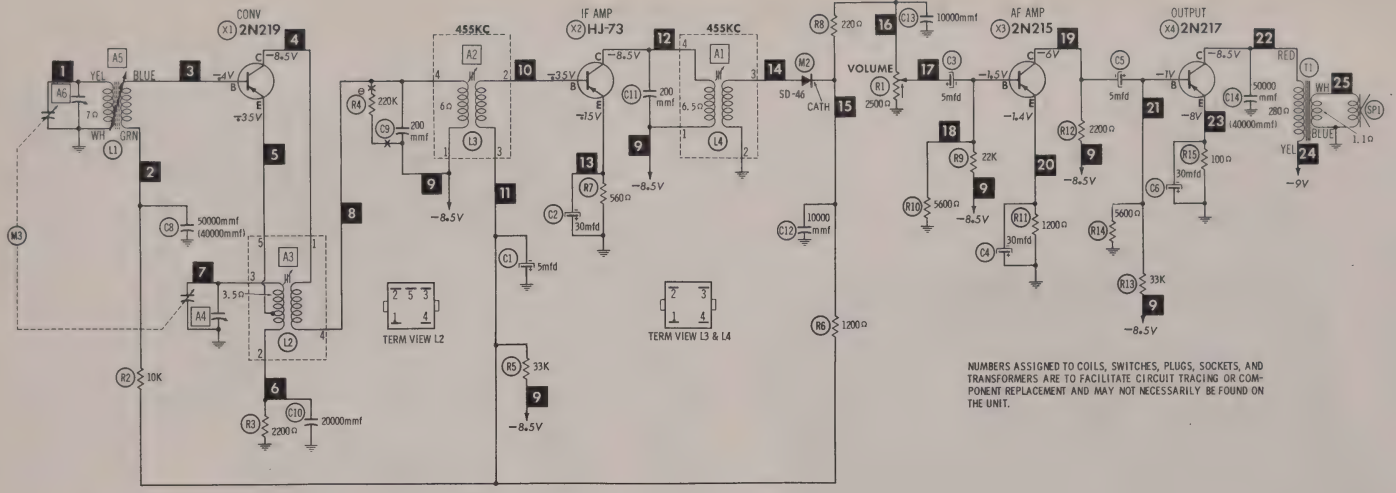


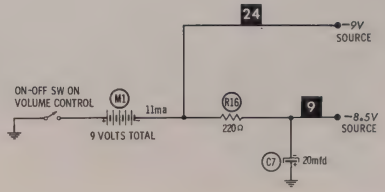
NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections or transistor terminals are shown as bottom views.
3. Measured values are from socket pin or terminal to common ground.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

❶ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)



RESISTANCE MEASUREMENTS NOT GIVEN BECAUSE OF THE WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
with CIRCUITRACE®

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JEFFERSON-TRAVIS
MODEL JT-D210

PARTS LIST AND DESCRIPTIONS

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA			NOTES
			RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	2N219	Converter	2N219	2N483	2N219	PNP
X2	HJ-73	IF Amplifier		2N631		PNP
X3	2N215	AF Amp.	2N407	2N362	2N104	PNP
X4	2N217	Output	2N407	2N631	2N217	PNP

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	Jefferson - Travis PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1	5	6	CD-231B		NLW5-6	TT6X5	ML5-6	TE-1084	
C2	30	3	CD-232B		NLW30-6	TT6X30	ML25-3	TE-1092	
C3	5	6	CD-231B		NLW5-6	TT6X5	ML5-6	TE-1084	
C4	30	3	CD-232B		NLW30-6	TT6X30	ML25-3	TE-1092	
C5	5	6	CD-231B		NLW5-6	TT6X5	ML5-6	TE-1084	
C6	30	3	CD-232B		NLW30-6	TT6X30	ML25-3	TE-1092	
C7	20	10	CD-233B		NLW20-15	TT15X20	MLV20-12	TE-1130	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C8	50000	(40000) †	C80V-503AM		H-05S5		TA-150	TG-S50
C9	200		DI-200	DD-201	L10T2	CCD-201	GP320	10TS-T2
C10	20000		C80V-203AM		H-05S2		TA-120	TG-S20
C11	200		DI-200	DD-201	L10T2	CCD-201	GP320	10TS-T2
C12	10000		C80V-103AM		H-05S1		TA-110	TG-S10
C13	10000		C80V-103AM		H-05S1		TA-110	TG-S10
C14	50000	(40000) †	C80V-503AM		H-05S5		TA-150	TG-S50

† Alternate Value.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	Jefferson-Travis PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R1	2500Ω	1/10	RD-127	B16-212				Volume & Switch

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REPLACEMENT DATA			ITEM No.	RATING	REPLACEMENT DATA		
		IRC PART No.	WORKMAN TV PART No.	REMARKS			IRC PART No.	WORKMAN TV PART No.	REMARKS
R2	10K			Note 1	R10	5600Ω			
R3	2200Ω				R11	1200Ω			
R4	220K				R12	2200Ω			
R5	33K				R13	33K			
R6	1200Ω				R14	5600Ω			
R7	560Ω				R15	100Ω			
R8	220Ω				R16	220Ω			
R9	22K								

Note 1. Not used in some versions.

PRINTED BOARD

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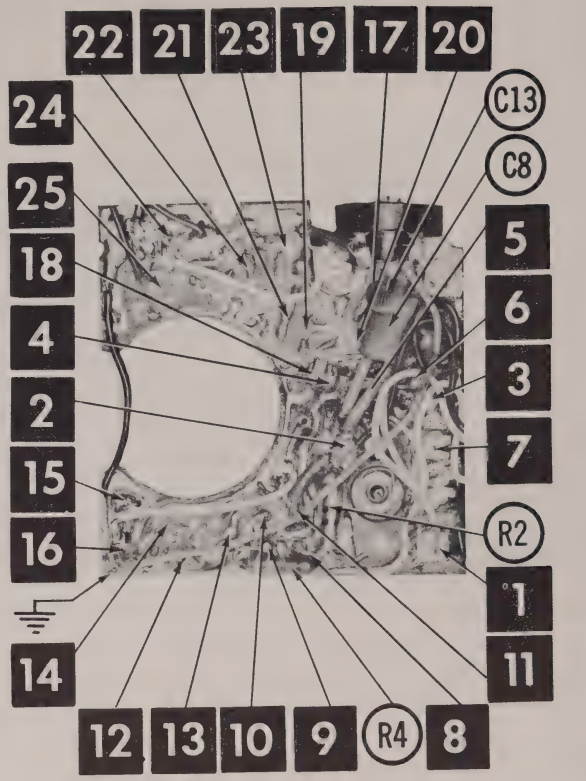


PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA				NOTES
		Jefferson-Travis PART No.	Merit PART No.	Miller PART No.	Stancor PART No.	
L1	Loopstick	LT-148K				
L2	Osc. Coil	LT-226				
L3	Input IF Trans.	LT-326A				
L4	Output IF Trans.	LT-326B				

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA					NOTES
	PRI.	SEC.	Jefferson-Travis PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	1500Ω	6-8Ω	LT-436					

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	Jefferson-Travis PART No.	QUAM PART No.	
SP1	2"	PM	6-8Ω	SP5-01		

BATTERIES

ITEM No.	VOLTAGE	Jefferson-Travis PART No.	REPLACEMENT DATA						NOTES
			BURGESS		EVEREADY		MALLORY		
			"A"	"B"	"A"	"B"	"A"	"B"	
M1	9V	BL006P		2U6		216		M-1604	

SIGNAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA				NOTES
		Jefferson-Travis PART No.	GENERAL ELECTRIC PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
M2	SD-46	SD-46		1N60	1N60	Detector (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	Jefferson-Travis PART No.	NOTES
M3	Tuning Cap.	CD-129	2 Gang

CABINETS & CABINET PARTS

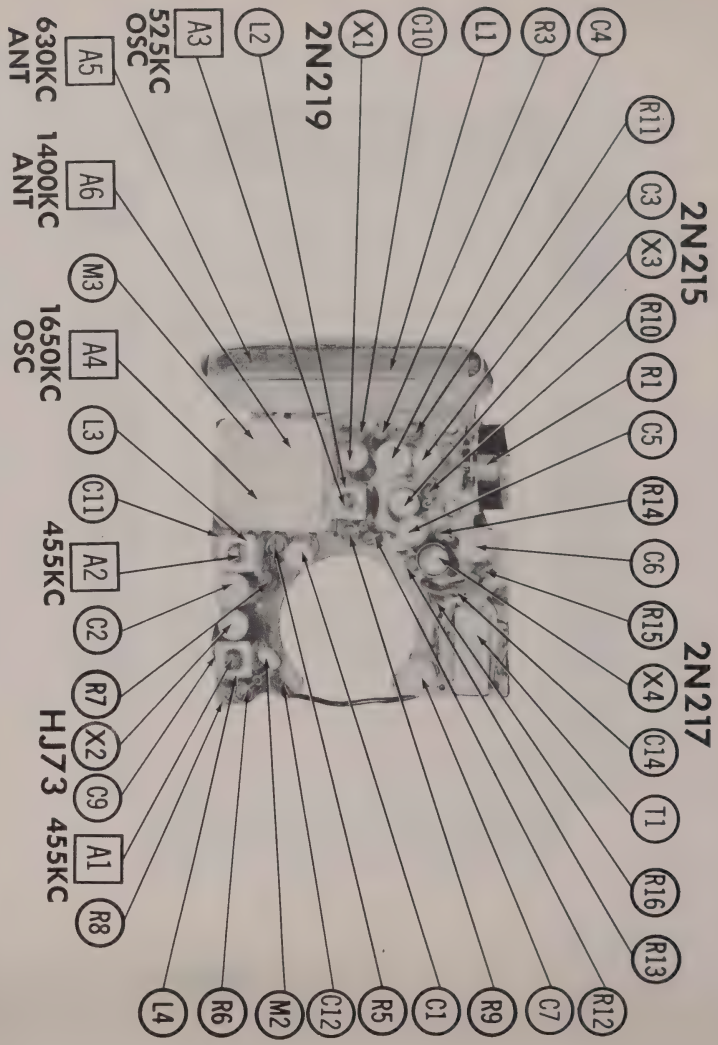
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Dial	MD-1961	
Cabinet	MD-1960B	

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

CHASSIS—TOP VIEW



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JEFFERSON-TRAVIS MODEL JT-H204

JEFFERSON-TRAVIS
MODEL JT-H204

JEFFERSON-TRAVIS
MODEL JT-H204

TRADE NAME	Jefferson-Travis Model JT-H204
SUPPLIER	Jefferson-Travis, Inc., Subsidiary of Emerson Radio & Phonograph Corp., 524 W. 23rd St., New York 11, N. Y.
TYPE SET	Battery Operated Transistorized Portable AM Receiver
POWER SUPPLY	9 Volts DC — RATING 7MA @ 9 Volts DC (No Signal, Min. Volume)
TUNING RANGE—BROADCAST	540 — 1600KC — 15MA @ 9 Volts DC (Signal, Normal Volume)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested Alignment Tools: A5, A7.. GENERAL CEMENT #5000, 5003, 5066, 8276, 8290, 9087, 9089
WALSCO #2512, 2525, 2528

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	High side thru .1mfd to antenna stator lug of tuning gang. Low side to chassis.	455KC (400~ Mod.)	Tuning gang fully open.	Across voice coil.	A1, A2, A3	Adjust for maximum output.
2.	Loop	525KC	Tuning gang fully closed.	"	A4	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.	"	1650KC	Tuning gang fully open.	"	A5	Adjust for maximum output. Repeat steps 2 and 3.
4.	"	630KC	630KC Signal.	"	A6	Adjust for maximum output.
5.	"	1400KC	1400KC Signal.	"	A7	"

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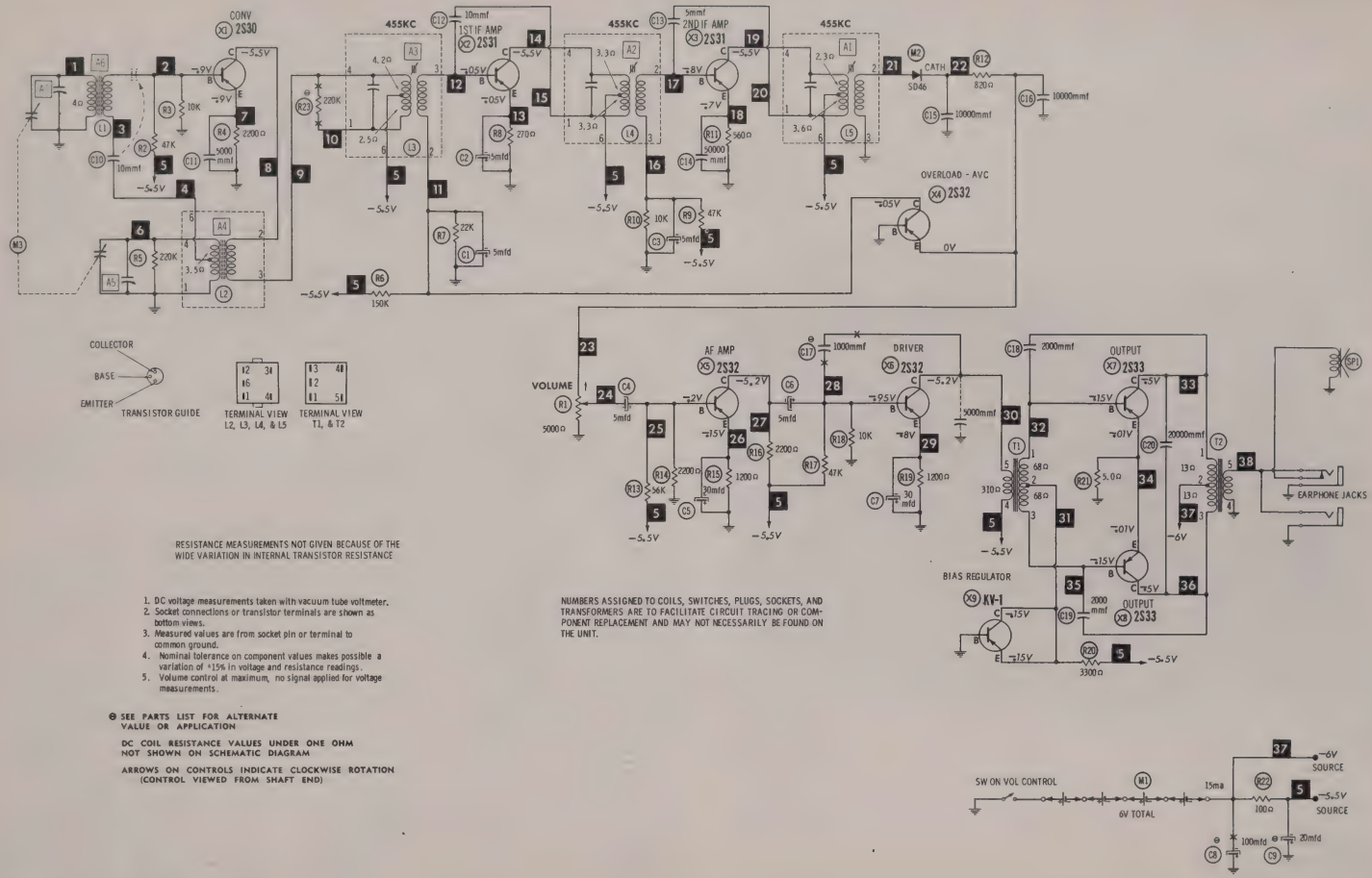
KF-245

SET 520 FOLDER 8


CONV
X1 2S30
455KC
1ST IF AMP
X2 2S31
455KC
2ND IF AMP
X3 2S31
455KC
CATH
SD46
OVERLOAD - AVC
X4 2S32
VOLUME
AF AMP
X5 2S32
DRIVER
X6 2S32
OUTPUT
X7 2S33
OUTPUT
X8 2S33
BIAS REGULATOR
X9 KV-1
EARPHONE JACKS
SPI
COLLECTOR
BASE
EMITTER
TRANSISTOR GUIDE
TERMINAL VIEW
L2, L3, L4, & L5
TERMINAL VIEW
T1, & T2
RESISTANCE MEASUREMENTS NOT GIVEN BECAUSE OF THE WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE
1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections or transistor terminals are shown as bottom views.
3. Measured values are from socket pin or terminal to common ground.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.
⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)
NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.
SW ON VOL CONTROL
6V TOTAL
15ma
100Ω
6V SOURCE
5.5V SOURCE
100mfd
20mfd

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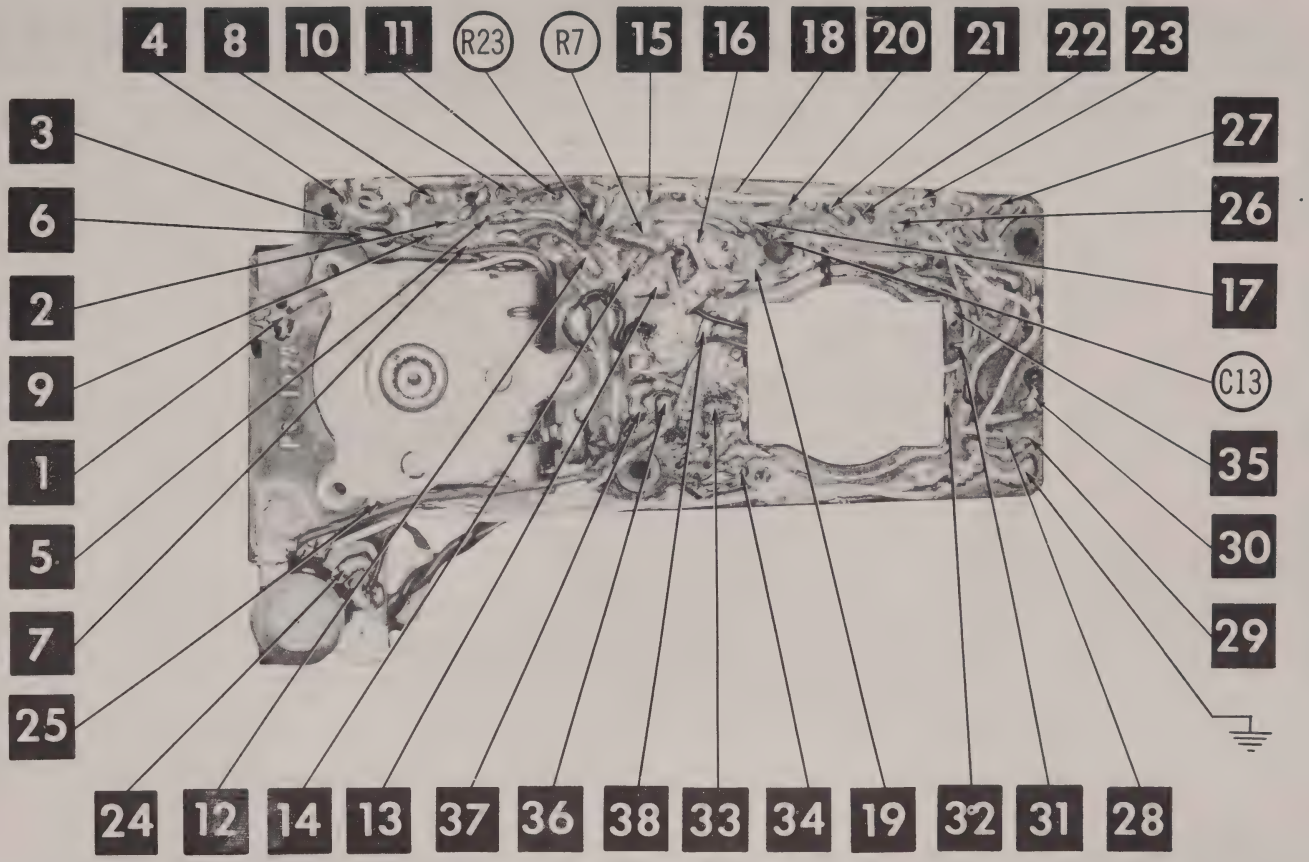
JEFFERSON-TRAVIS
MODEL JT-H204



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PRINTED BOARD

PARTS LIST AND DESCRIPTIONS

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA			NOTES
			RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	2S30	Converter	2N412	2N486		PNP
X2	2S31	1st IF Amplifier	2N410	2N483		PNP
X3	2S31	2nd IF Amplifier	2N410	2N483		PNP
X4	2S32	Overload & AVC	2N406	2N363		PNP
X5	2S32	AF Amplifier	2N406	2N363		PNP
X6	2S32	Driver	2N406	2N363		PNP
X7	2S33	Output	2N408	2N632		PNP
X8	2S33	Output	2N408	2N632		PNP
X9	KV-1	Bias Regulator				PNP

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	Jefferson-Travis PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1	5	6	CD-231B	XPP-6005	NLW5-6	TT6X5	ML5-6	TE-1084	
C2	5	6	CD-231B	XPP-6005	NLW5-6	TT6X5	ML5-6	TE-1084	
C3	5	6	CD-231B	XPP-6005	NLW5-6	TT6X5	ML5-6	TE-1084	
C4	5	6	CD-231B	XPP-6005	NLW5-6	TT6X5	ML5-6	TE-1084	
C5	30	3	CD-232B	PTT3030	ECPB12	TT6X30	ML30-6	TE-1092	
C6	5	6	CD-231B	XPP-6005	NLW5-6	TT6X5	ML5-6	TE-1084	
C7	30	3	CD-232B	PTT3030	ECPB12	TT6X30	ML30-6	TE-1092	
C8	100	6	CD-225 ①	PTT6100	NLW100-6	TT6X100	ML100-6	TE-1102	
C9	20	10	②	BCD12020	ECPB410	PET1570	MLV20-12	VL-1129	

① Not used in some versions.
② Some versions may use 100mfd in this application (Part #CD-225).

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C10	10		C80V100AM	DD-100	L10Q1	CCD-100	GP410	10TS-Q10
C11	5000		C80V502AM	DM-502	H-05D5	CCD-502	TA-250	TG-D50
C12	10		C80V100AM	DD-100	L10Q1	CCD-100	GP410	10TS-Q10
C13	5		DI-5	DD-050	L10V5	CCD-050	GP550	10TS-V50
C14	50000		C80V503AM	DA-503	H-05S5		TA-150	TG-S50
C15	10000		C80V103AM	DM-103	H-05S1		TA-110	TG-S10
C16	10000		C80V103AM	DM-103	H-05S1		TA-110	TG-S10
C17	1000	Note 1	C80V102AM	DM-102	H-05D1	CCD-102	B-210	10TS-D10

FIXED CAPACITORS (cont)

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No
C18	2000		BPD-002	DM-202	BYA10D2	CCD-202	B-220	10TS-D20
C19	2000		BPD-002	DM-202	BYA10D2	CCD-202	B-220	10TS-D20
C20	20000		C80V203AM	DDM-203	H-05S2		TA-120	TG-S20

Note 1. Not used in some versions.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	Jefferson-Travis PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R1	5000Ω	1/4	RD-118-2A	B16-214				Volume & Switch

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REPLACEMENT DATA			ITEM No.	RATING	REPLACEMENT DATA		
		IRC PART No.	WORKMAN TV PART No.	REMARKS			IRC PART No.	WORKMAN TV PART No	REMARKS
R2	47K				R13	56K			
R3	10K				R14	2200Ω			
R4	2200Ω				R15	1200Ω			
R5	220K				R16	2200Ω			
R6	150K				R17	47K			
R7	22K				R18	10K			
R8	270Ω				R19	1200Ω			
R9	47K				R20	3300Ω			
R10	10K				R21	5.0Ω			
R11	560Ω				R22	100Ω			
R12	820Ω				R23	220K			Note 1

Note 1. Not used in some versions.

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA				NOTES
		Jefferson - Travis PART No.	Merit PART No.	Miller PART No.	Stancor PART No.	
L1	Loopstick	LT-153K				
L2	Osc. Coil	LT-230				
L3	1st IF Trans.	LT-328A				
L4	2nd IF Trans.	LT-328B				
L5	3rd IF Trans.	LT-328C				

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO		REPLACEMENT DATA					NOTES
	PRI.	SEC.	Jefferson-Travis PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	1.5	1	LT-515		TA-28			

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA					NOTES
	PRI.	SEC.	Jefferson-Travis PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	1000Ω CT	6-8Ω	LT438		TA-25①			① Use 8Ω Sec. Tap.

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	Jefferson-Travis PART No.	QUAM PART No.	
SP1	2½"	PM	6-8Ω	SP6.5-03		

BATTERIES

ITEM No.	VOLTAGE	Jefferson-Travis PART No.	REPLACEMENT DATA						NOTES
			BURGESS		EVEREADY		MALLORY		
			"A"	"B"	"A"	"B"	"A"	"B"	
M1	1.5V			930 *		1015 *		M-15R *	* 4 Required

SIGNAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA				NOTES
		Jefferson-Travis PART No.	GENERAL ELECTRIC PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
M2	SD-46	SD-46		1N60	1N60	Detector (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	Jefferson-Travis PART No.	NOTES
M3	Tuning Cap.	CD-128	2 Gang

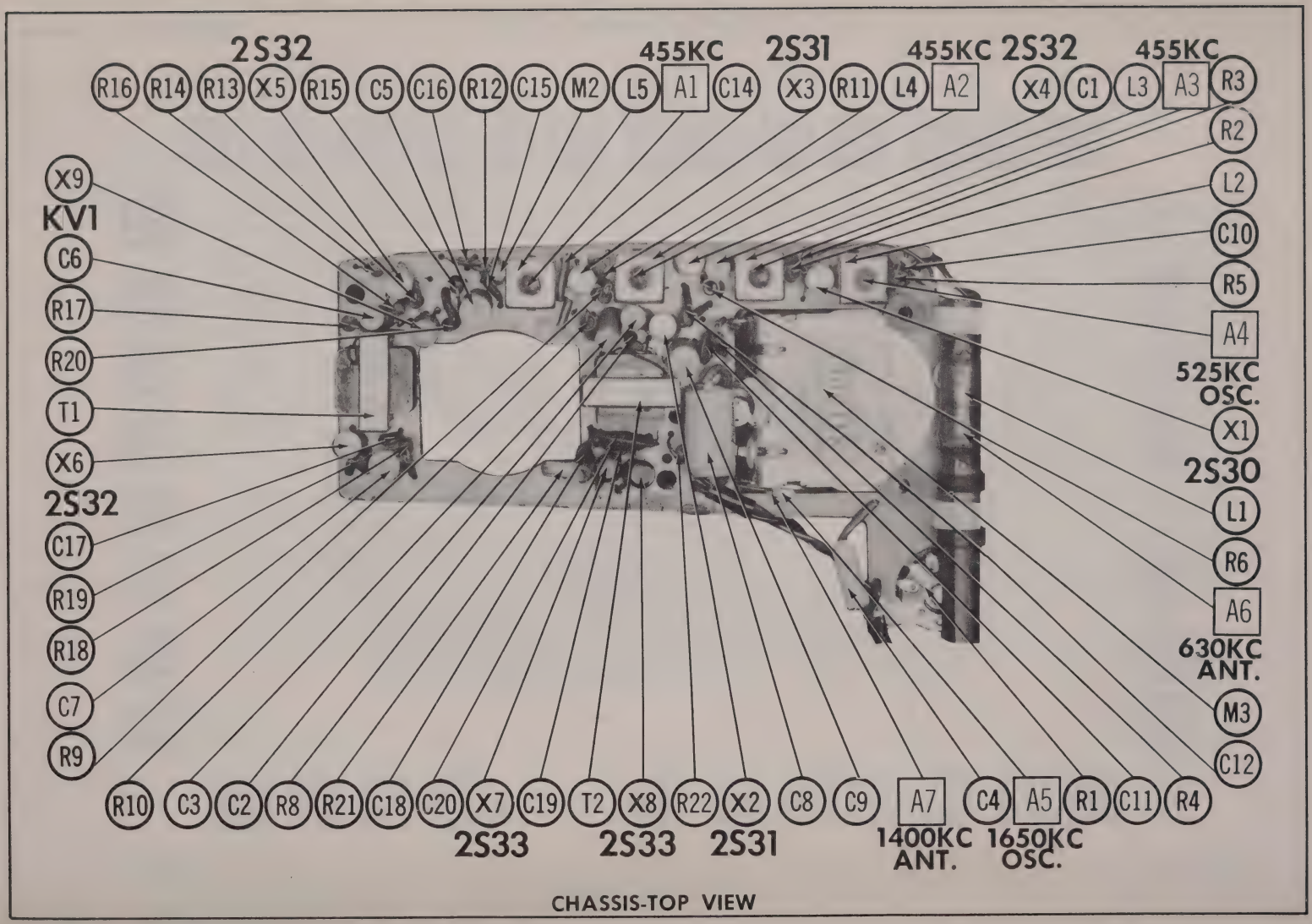
CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Cabinet	MD-1930B	

WIRING DATA

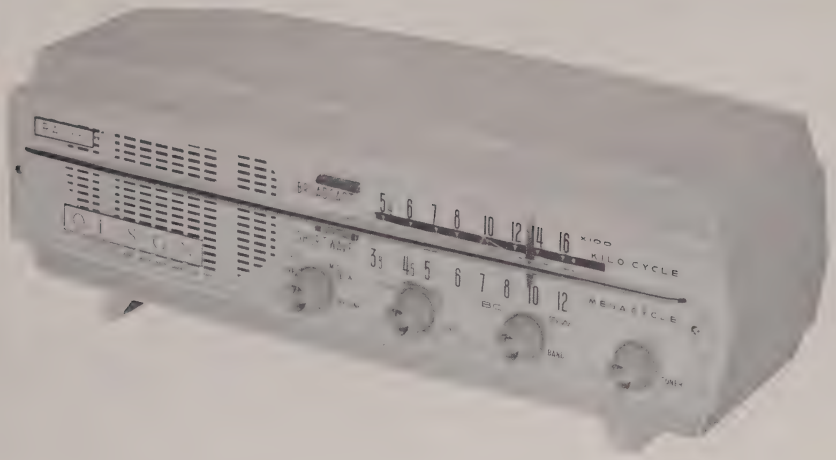
General-use Unshielded Hook-up Wire .....Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors



CHASSIS-TOP VIEW

PHOTOFACT® Folder

**OLSON MODEL
RA-351**



TRADE NAME	Olson Model RA-351
SUPPLIER	Olson Radio Corp., 260 S. Forge Street, Akron 8, Ohio
TYPE SET	AC Operated 5 Tube BC-SW Receiver
POWER SUPPLY	110 - 120 Volts AC, 60 Cycles RATING 31 Watts, .34 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540 — 1600KC SHORT WAVE 3.8 — 12MC

ALIGNMENT INSTRUCTIONS

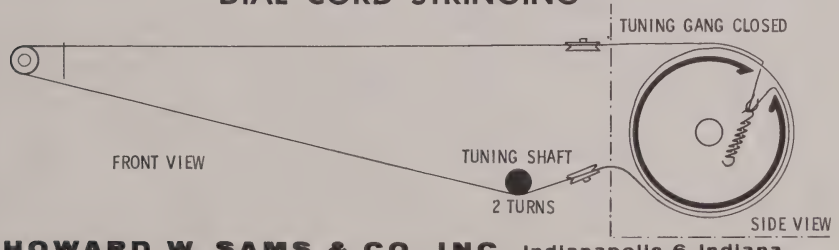
ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested Alignment Tools: A1 Thru A4...GENERAL CEMENT #8721, 8722
WALSCO #2519
A5 Thru A8...GENERAL CEMENT #5000, 5003, 5066, 8271, 8272, 8276, 8277, 8290, 8609, 8722, 9150, 9298
WALSCO #2515, 2516, 2518, 2519, 2525, 2541

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	High side thru .1mfd to pin 7 (grid) of Converter. Low side to chassis.	455KC (400∿ Mod.)	(BC) Tuning gang fully open.	Across voice coil.	A1, A2, A3, A4	Adjust for maximum output.
2.	High side thru 270Ω to antenna terminal. Low side to chassis.	1600KC	(BC) 1600KC	"	A5	"
3.	"	1400KC	(BC) 1400KC Signal.	"	A6	Adjust for maximum output while rocking tuning gang.
4.	"	12MC	(SW) 12MC	"	A7, A8	Adjust for maximum output.

DIAL CORD STRINGING



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PARTS LIST AND DESCRIPTIONS

TUBES

• GENERAL ELECTRIC •		RAYTHEON • SYLVANIA •			
ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V1	Converter	6BE6	V4	Output	6AR5
V2	IF Amplifier	6BD6	V5	Rectifier	5M-K9
V3	Det.-AVC-AF Amp.	6AT6			

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	OLSON PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	20	300		AFH2-37	B0300	FP227	TMD-2295	TVL-2626	
B	20	300							
C2	10	50		SRE50V10	BBR10-50	TC32	TD-10-50	TVA-1304	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C3								
C4								
C5	.1 400V		P488N-1	DF-104	CUB4P1	4DP-3-104	GEM-401	4TM-P10
C6	.1 400V		P488N-1	DF-104	CUB4P1	4DP-3-104	GEM-401	4TM-P10
C7	50		1468-00005	DD-500	5W5Q5	CM-20B-500M	MC225	1FM-45
C8	3000		1467-003	DD-302	1W5D3	CM-30B-302M	MC461	1FM-23
C9								
C10								
C11								
C12	.1 400V		P488N-1	DF-104	CUB4P1	4DP-3-104	GEM-401	4TM-P10
C13	100		1468-0001	DD-101	5W5T1	CM-20B-101M	MC235	1FM-31
C14	100		1468-0001	DD-101	5W5T1	CM-20B-101M	MC235	1FM-31
C15	.01 400V		P488N-01	D6-103	CUB4S1	4DP-1-103	GEM-411	4TM-S10
C16	100		1468-0001	DD-101	5W5T1	CM-20B-101M	MC235	1FM-31
C17	.005 400V		P488N-005	D6-502	CUB6D5	6DP-1-502	GEM-425	6TM-D50
C18	.005 400V		P488N-005	D6-502	CUB6D5	6DP-1-502	GEM-425	6TM-D50
C19	.01 400V		P488N-01	D6-103	CUB4S1	4DP-1-103	GEM-411	4TM-S10
C20	.005 400V		P488N-005	D6-502	CUB6D5	6DP-1-502	GEM-425	6TM-D50
C21	.005 400V		P488N-005	D6-502	CUB6D5	6DP-1-502	GEM-425	6TM-D50

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	OLSON PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R1A	500K	½		AB-60				Volume
B	Shaft			AK-29				
C	Switch			KR-3				Radio-Phono Switch

RESISTORS (IRC or EQUIVALENT)

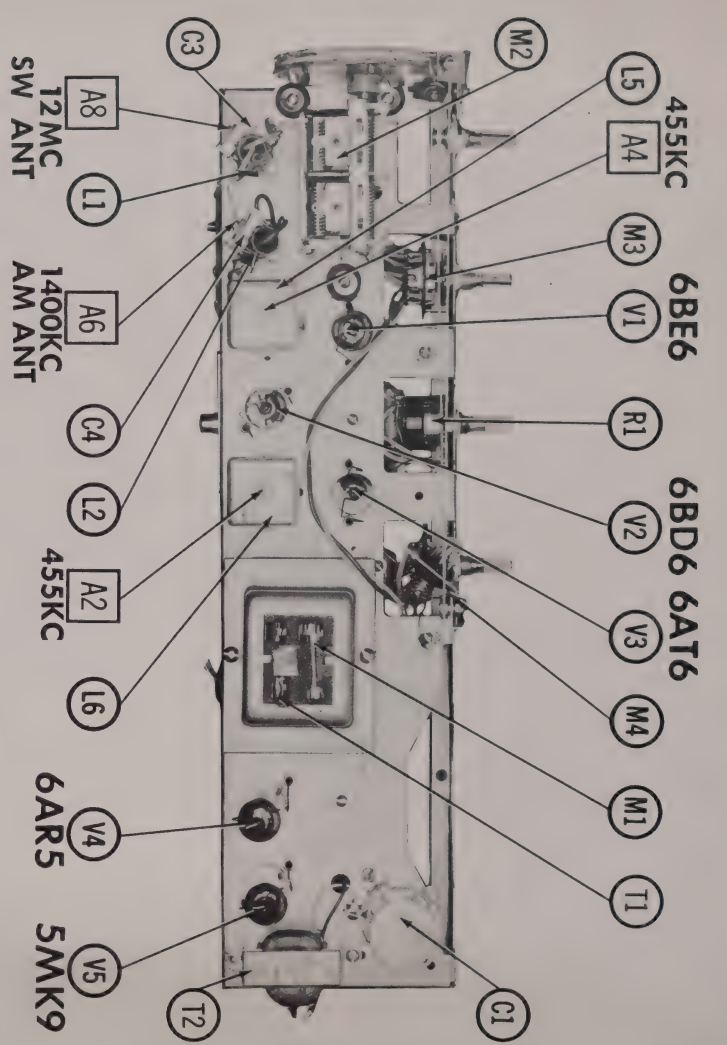
All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R2	20K	
R3	1meg	
R4	300Ω	
R5	50K	

ITEM No.	RATING	REMARKS
R6	250K	
R7	5meg	
R8	500K	
R9	420Ω 5W	IRC#PW5-420Ω

ITEM No.	RATING	REMARKS
R10	15K 5W	IRC#PW5-15KΩ
R11	2000Ω 5W	IRC#PW5-2000Ω

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA				NOTES
		OLSON PART No.	Merit PART No.	Miller PART No.	Stancor PART No.	
L1	SW Ant. Trans.					
L2	BC Ant. Trans.					
L3	SW Osc. Coil					
L4	BC Osc. Coil					
L5	Input IF Trans.					
L6	Output IF Trans.					

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA					NOTES
	PRI.	SEC. 1	SEC. 2	OLSON PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	117V @ .34A Tap @ 110V (Not Used)	205V @ .055A	5V @ .6A						
	SEC. 3	SEC. 4	SEC. 5						
	6.3V @ 1.5A								

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA					NOTES
	PRI.	SEC.	OLSON PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	5300Ω	3-4Ω		A-2930	A-3877	24S51	S-3X	

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	OLSON PART No.	QUAM PART No.	
SP1	4"x6"	PM	3-4Ω	E-51B	46A1	

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			OLSON PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1		1A 117V			312001 (3AG 1A 125V)	357001	AGC 1	4405

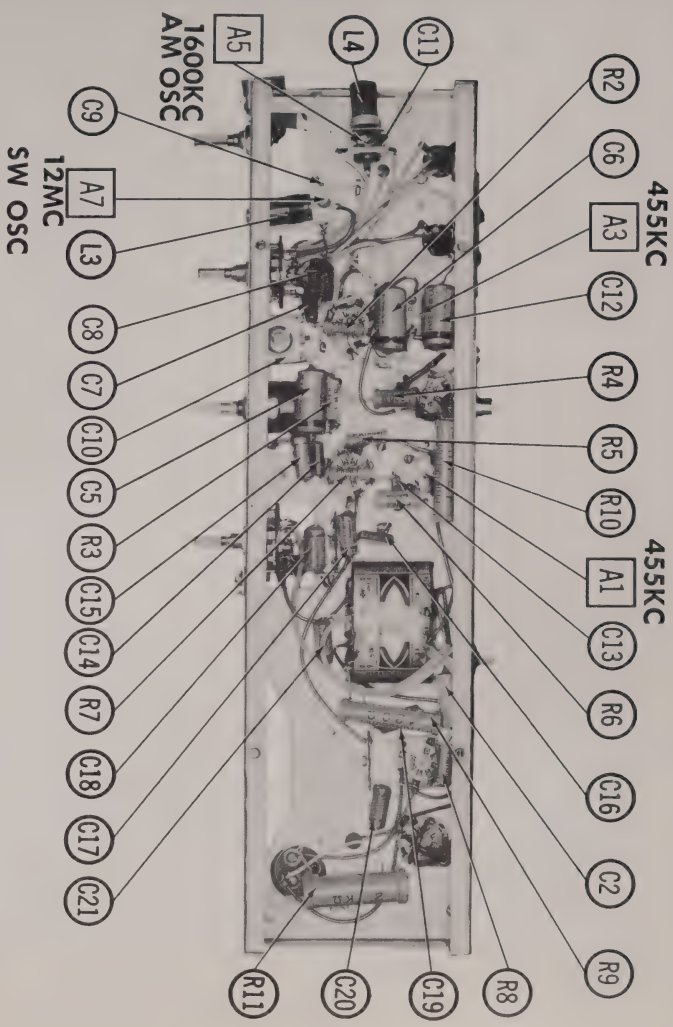
MISCELLANEOUS

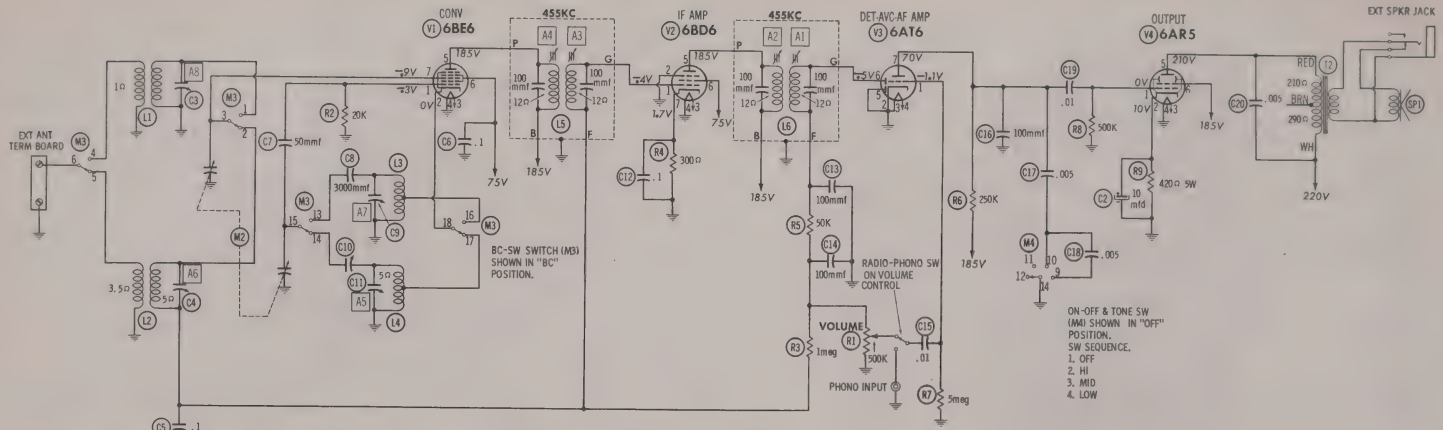
ITEM No.	PART NAME	OLSON PART No.	NOTES
M2	Tuning Cap.		2 Gang
M3	Switch		Band Selector (Rotary Wafer Type)
M4	Switch		Tone-Power (Rotary Wafer Type)

WIRING DATA

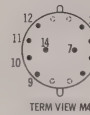
General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No. 1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)

CHASSIS—BOTTOM VIEW





NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.


TERM VIEW M4

TERM VIEW M3

TERM VIEW L5 & L6

RESISTANCE READINGS

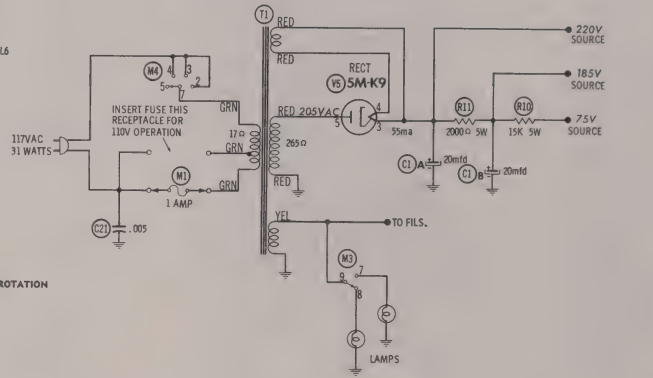
ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	6BE6	20K	0Ω	.1Ω	0Ω	†2000Ω	†17K	1.5meg ▬0Ω
V2	6BD6	1.5meg	0Ω	.1Ω	0Ω	†2000Ω	†17K	300Ω
V3	6AT6	5meg	0Ω	0Ω	.1Ω	0Ω	550K	†250K
V4	6AR5	500K	420Ω	.1Ω	0Ω	†500Ω	†2000Ω	NC
V5	5M-K9	TP	NC	¶	¶	265Ω	TP	TP

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
▬ MEASURED IN "SHORT WAVE" POSITION.
† MEASURED FROM PIN 3 OF V5.
NC NO CONNECTION
TP TIE POINT

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured with 1000 ohm per volt voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common ground.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION



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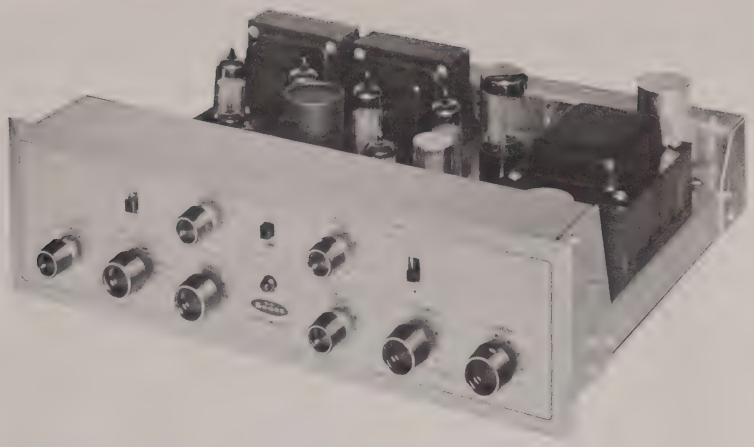
OLSON MODEL RA-351

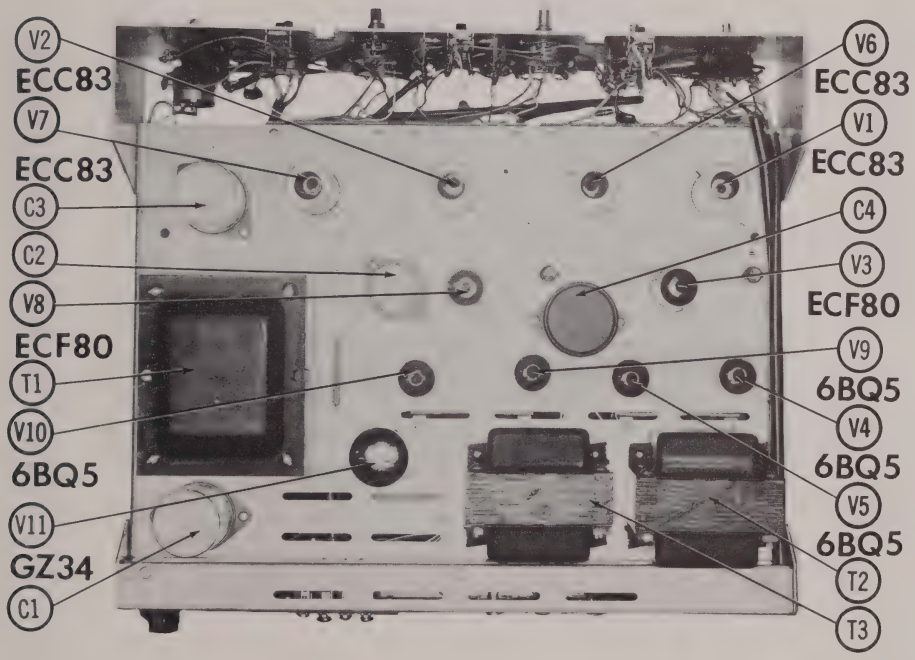
PHOTOFACT® Folder

**H. H. SCOTT
MODEL 222**



H. H. SCOTT
MODEL 222

TRADE NAME	H. H. Scott Model 222
MANUFACTURER	H. H. Scott, Inc., 111 Powder Mill Road, Maynard, Mass.
TYPE SET	AC Operated 11 Tube Stereo Amplifier
POWER SUPPLY	105 – 125 Volts AC, 60 Cycles RATING 130 Watts, 1.15 Amp. @ 117 Volts AC

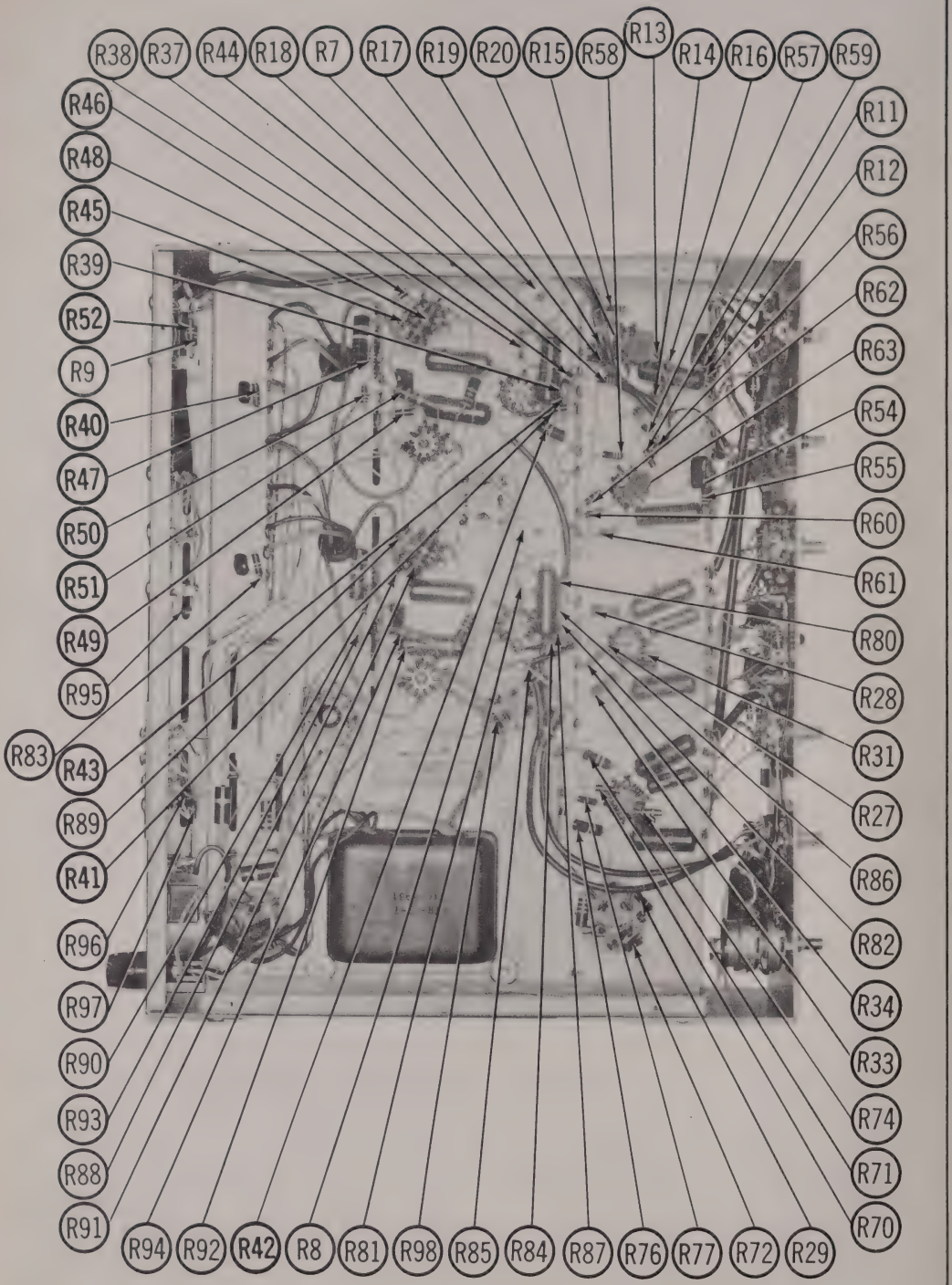


H. H. SCOTT
MODEL 222

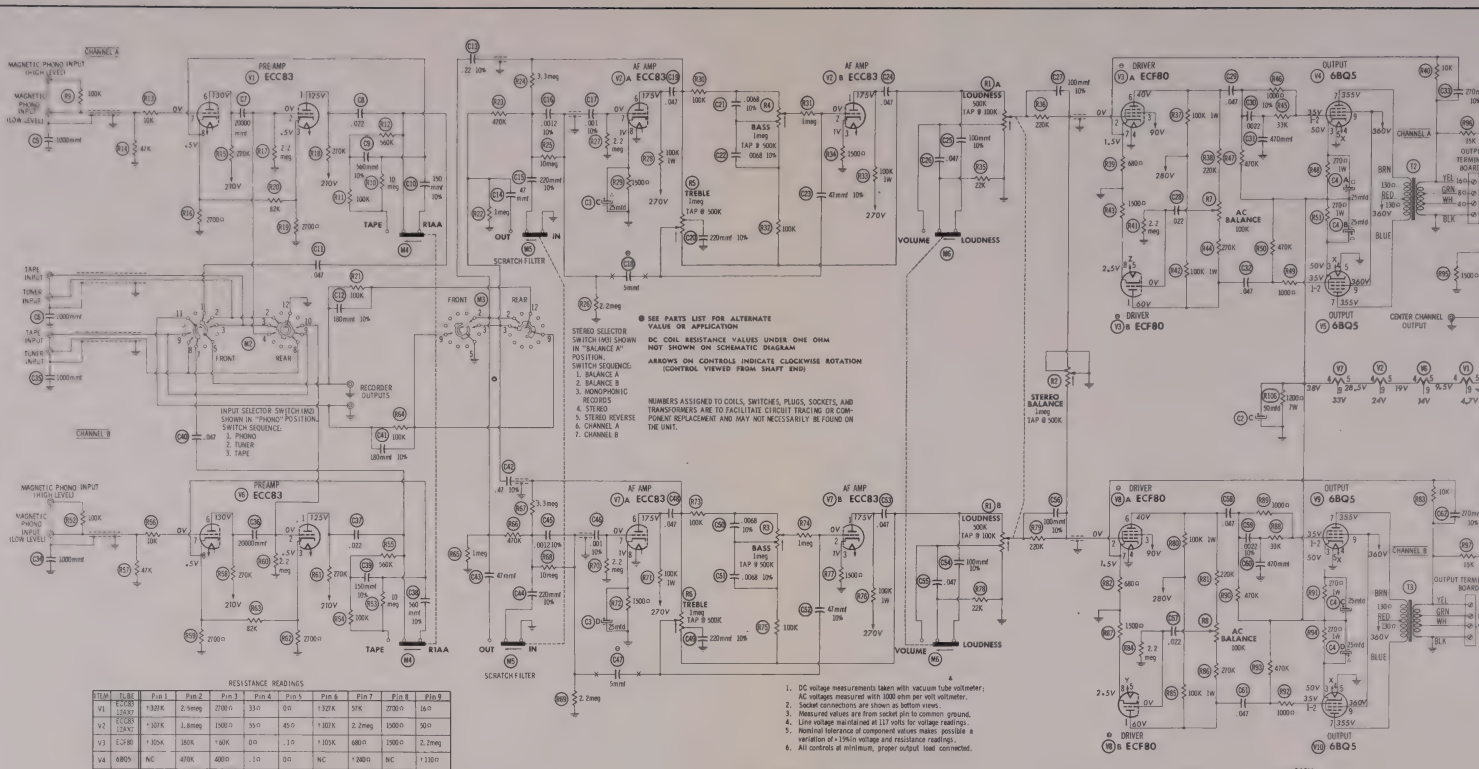
HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of KV050

the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1961 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION



● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

STEREO SELECTOR SWITCH (M3) SHOWN IN "BALANCE A" POSITION. SWITCH SEQUENCE:
1. BALANCE A
2. BALANCE B
3. MONOPHONIC RECORDS
4. STEREO
5. STEREO REVERSE
6. CHANNEL A
7. CHANNEL B

INPUT SELECTOR SWITCH (M2) SHOWN IN "PHONO" POSITION. SWITCH SEQUENCE:
1. PHONO
2. TUNER
3. TAPE

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	ECC83 12AX7	†.32K	2.5meg	270Ω	33Ω	0Ω	†.32K	57K	270Ω	16Ω
V2	ECC83 12AX7	†.32K	1.8meg	150Ω	35Ω	45Ω	†.32K	2.2meg	150Ω	50Ω
V3	ECF80	†.105K	180K	†60K	0Ω	.1Ω	†.105K	680Ω	150Ω	2.2meg
V4	6BQ5	NC	470K	400Ω	.1Ω	0Ω	NC	†240Ω	NC	†110Ω
V5	6BQ5	NC	470K	400Ω	.1Ω	0Ω	NC	†240Ω	NC	†110Ω
V6	ECC83 12AX7	†.32K	2.5meg	270Ω	45Ω	33Ω	†.32K	57K	270Ω	39Ω
V7	ECC83 12AX7	†.32K	1.8meg	150Ω	65Ω	55Ω	†.32K	2.2meg	150Ω	60Ω
V8	ECF80	†.105K	180K	†61K	0Ω	.1Ω	†.105K	680Ω	150Ω	2.2meg
V9	6BQ5	NC	470K	400Ω	.1Ω	0Ω	NC	†240Ω	NC	†110Ω
V10	6BQ5	NC	470K	400Ω	.1Ω	0Ω	NC	†240Ω	NC	†110Ω
V11	GZ34 5AR4	NC	†	NC	80Ω	NC	80Ω	NC	†	

† THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
† MEASURED FROM PIN 8 OF V11. NC NO CONNECTION

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured with 1000 ohm per volt voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common ground.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ± 10% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

TUBE LAYOUT (BOTTOM VIEW)

SW ON LOUDNESS CONTROL

AC RECEPTACLE

RECT GZ34

360V SOURCE
280V SOURCE
270V SOURCE
210V SOURCE
90V SOURCE

NEON LAMP

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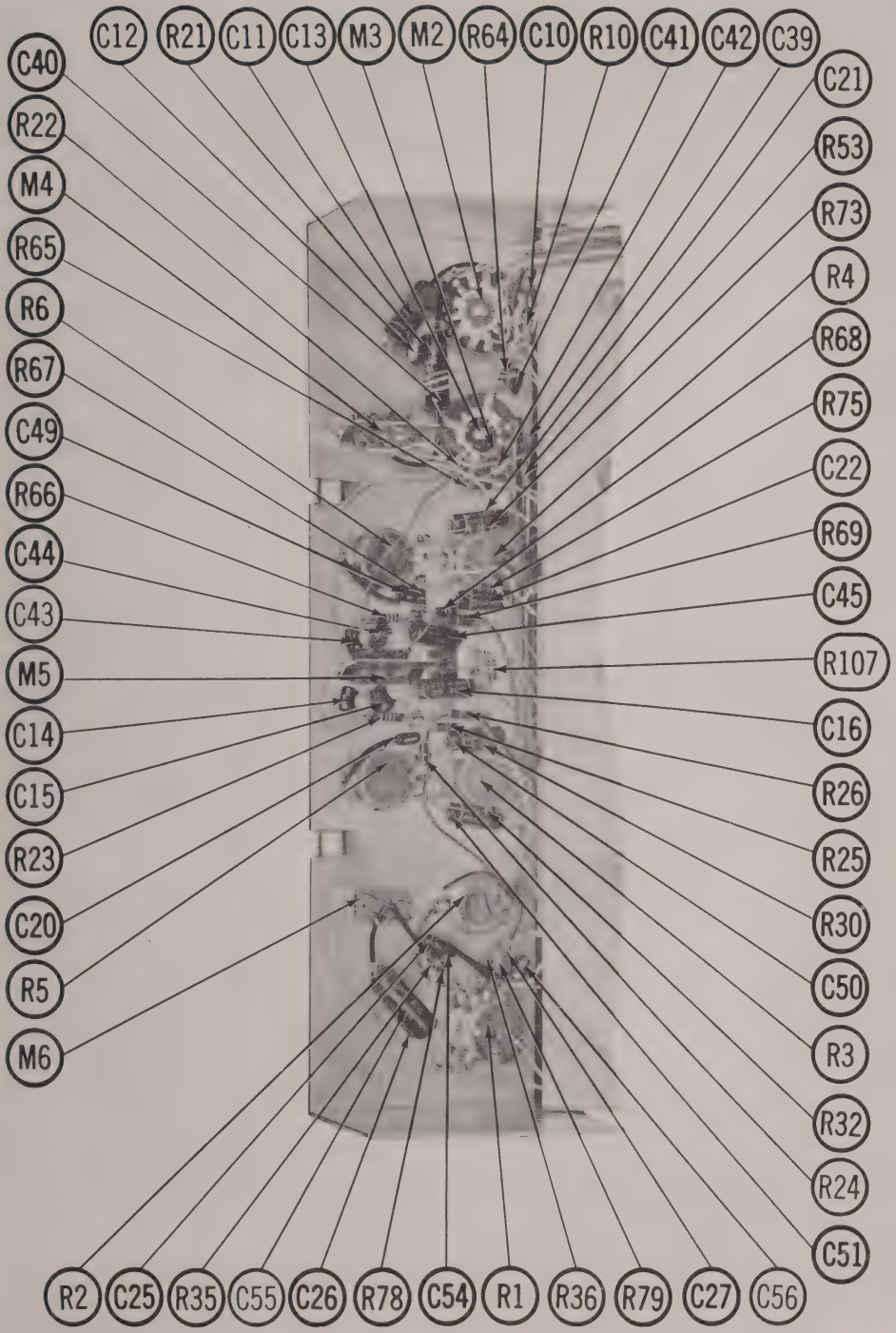
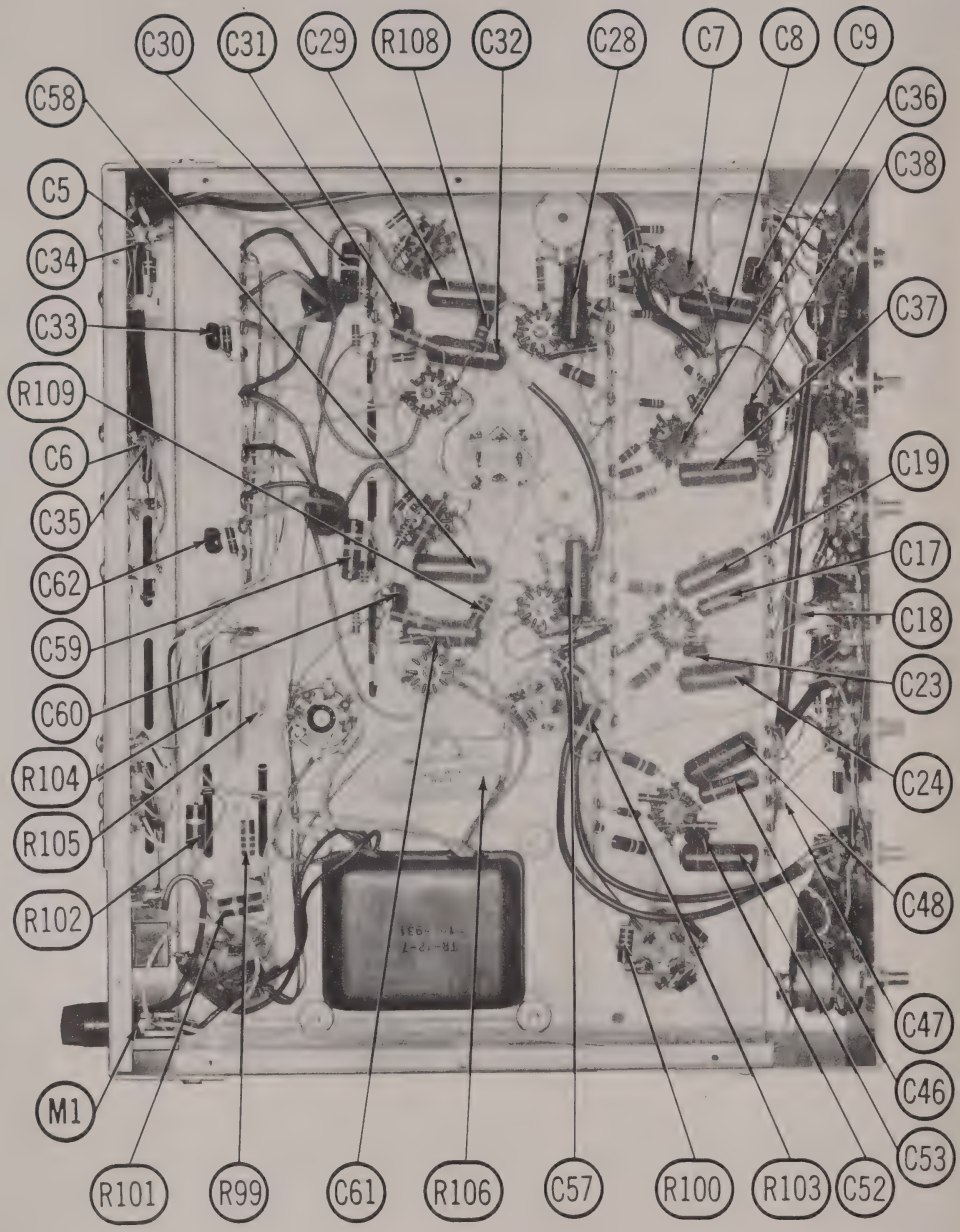
MODEL 222



CONTROL PANEL — REAR VIEW



CHASSIS BOTTOM VIEW – CAPACITOR, MISC. & RESISTOR IDENT.

PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No.	USE	TYPE (GENERAL ELECTRIC • RAYTHEON • SYLVANIA)
V1	Channel A Preamp.	ECC83/12AX7
V2	Channel A AF Amp.	ECC83/12AX7
V3	Channel A Driver	ECF80 (6BL8)*
V4	Channel A Output	6BQ5
V5	Channel A Output	6BQ5
V6	Channel B Preamp.	ECC83/12AX7
V7	Channel B AF Amp.	ECC83/12AX7
V8	Channel B Driver	ECF80 (6BL8) *
V9	Channel B Output	6BQ5
V10	Channel B Output	6BQ5
V11	Rectifier	GZ34/5AR4

* Alternate

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA H. H. SCOTT PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	▲20	450	CEC-4X20/450		C0270	FP376.5	TMQ-4616	TVL-3780	
B	▲20	450			BR2045	TC75		TVA-1709	
C	■20	450							
D	20	450							
C2A	■10	450	CEC-10-4-50			FP231		TVL-2933	
B	▲4	250				TC49		TVA-1414	
C	50	100							
C3A	▲20	450	CEC2X20-2X25	AFH4-67	D0520	FP430.97	TMQ-4475	TVL-4724.2	
B	■20	450							
C	▲25	25							
D	25	25							
C4A	■25	25	CEC4X25/25	AFH4-25	D0190	FP408.9	TMQ-4025	TVL-4210	
B	▲25	25							
C	25	25							
D	▲25	25							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C5	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C6	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C7	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C8	.022 400V		P488N-022	DD-203	CUB4S22	4DP-2-223	GEM-4122	4TM-S22
C9	560 10%		1469-00056		5R5T56	CM-19B-561K	MCJ247	MS-356
C10	150 10%		1469-00015	TCZ-150	22R5T15	CM-19B-151K	MCB236	MS-315
C11	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C12	180 10%		1469-00018	TCZ-180	22R5T18	CM-19B-181K	CNO-318	MS-318
C13	.22 10%							
C14	47		1468-000047	TCZ-47	5W5Q47	CM-19B-470M	CNO-447	1FM-447
C15	220 10%		1469-00022	TCZ-220	22R5T22	CM-19B-221K	CNO-322	MS-322
C16	.0012 400V 10%		P684CM-0012	DD-122	DPMS6D12	6DP-1-122	GP212	5BF-D12
C17	.001 400V 10%		V84C6D1	DD-102	PM6D1	6DP-1-102	GP210	6TM-D1
C18	5	Note 1	DI-5	DD-050	L10V5	CCD-050	GP547	10TS-V50
C19	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C20	220 10%		1469-00022	TCZ-220	22R5T22	CM-19B-221K	CNO-322	MS-322
C21	.0068 400V 10%		V84C4D68-10%		PM6D68	6DP-1-682	GEM-16268	6TM-D68
C22	.0068 400V 10%		V84C4D68-10%		PM6D68	6DP-1-682	GEM-16268	6TM-D68
C23	47 10%		1469-000047	TCZ-47	22R5Q47	CM-19B-470M	CNO-447	MS-447
C24	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C25	100 10%		1469-0001	TCZ-100	22R5T1	CM-19B-101K	MCB235	MS-31
C26	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C27	100 10%		1469-0001	TCZ-100	22R5T1	CM-19B-101K	MCB235	MS-31
C28	.022 400V		P488N-022	DD-203	CUB4S22	4DP-2-223	GEM-4122	4TM-S22
C29	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C30	.0022 400V 10%		V84C4D22-10%		PM6D22	6DP-1-222K	GP222	6TM-D22
C31	470		1468-00047	DD-471	5W5T47	CM-19B-471M	MCJ244	1FM-347

FIXED CAPACITORS (cont)

ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C32	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C33	270 10%		1469-00027	TCZ-270	5R5T27	CM-19B-271K	CNO-327	MS-327
C34	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C35	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C36	20000		BPD-02	DD-203	BYB6S2	CCD-203	B-120	5HK-S20
C37	.022 400V		P488N-022	DD-203	CUB4S22	4DP-2-223	GEM-4122	4TM-S22
C38	560 10%		1469-00056		5R5T56	CM-19B-561K	MCJ247	MS-356
C39	150 10%		1469-00015	TCZ-150	22R5T15	CM-19B-151K	MCB236	MS-315
C40	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C41	180 10%		1469-00018	TCZ-180	22R5T18	CM-19B-181K	CNO-318	MS-318
C42	.47 10%		NPO-SI .5	TCZ-R5				
C43	47		1468-000047	TCZ-47	5W5Q47	CM-19B-470M	CNO-447	1FM-447
C44	220 10%		1469-00022	TCZ-220	22R5T22	CM-19B-221K	CNO-322	MS-322
C45	.0012 400V 10%		P684CM-0012	DD-122	DPMS6D12	6DP-1-122	GP212	5BF-D12
C46	.001 400V 10%		V84C6D1-10%	DD-102	PM6D1	6DP-1-102	GP210	6TM-D1
C47	5	Note 1	DI-5	DD-050	L10V5	CCD-050	GP547	10TS-V50
C48	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C49	220 10%		1469-00022	TCZ-220	22R5T22	CM-19B-221K	CNO-322	MS-322
C50	.0068 400V 10%		V84C4D68-10%		PM6D68	6DP-1-682	GEM-16268	6TM-D68
C51	.0068 400V 10%		V84C4D68-10%		PM6D68	6DP-1-682	GEM-16268	6TM-D68
C52	47 10%		1469-000047	TCZ-47	22R5Q47	CM-19B-470K	CNO-447	MS-447
C53	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C54	100 10%		1469-0001	TCZ-100	22R5T1	CM-19B-101K	MCB235	MS-31
C55	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C56	100 10%		1469-0001	TCZ-100	22R5T1	CM-19B-101K	MCB235	MS-31
C57	.022 400V		P488N-022	DD-203	CUB4S22	4DP-2-223	GEM-4122	4TM-S22
C58	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C59	.0022 400V 10%		V84C4D22-10%		PM6D22	6DP-1-222	GP222	6TM-D22
C60	470		1468-00047	DD-471	5W5T47	CM-19B-471M	MCJ244	1FM-347
C61	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C62	270 10%		1469-00027	TCZ-270	5R5T27	CM-19B-271K	CNO-327	MS-327

Note 1. Not used in some versions.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA H. H. SCOTT PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500K 100K Tap	½	RCVD-500KT-3FSW	BT-66			FA55T15	Loudness, Channel A
B	500K 100K Tap	½		STR-66			RU55T15	Loudness, Channel B
C	Shaft			Not Req.			CS3500	
D	Switch			KR-1			US-41	Power Off-On
R2A	1meg 500K Tap	½	RCV-1MST-3F	BT-71	A47F5-1meg	Q19-137X	UT-443	Stereo Balance
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R3A	1meg 500K Tap	½	RCV-1MT-3F	BT-71	A47F5-1meg	Q19-137X	UT-443	Bass, Channel B
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R4A	1meg 500K Tap	½	RCV-1MT-3F	BT-71	A47F5-1meg	Q19-137X	UT-443	Bass, Channel A
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R5A	1meg 500K Tap	½	RCV-1MT-3F	BT-71	A47F5-1meg	Q19-137X	UT-443	Treble, Channel A
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R6A	1meg 500K Tap	½	RCV-1MT-3F	BT-71	A47F5-1meg	Q19-137X	UT-443	Treble, Channel B
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R7A	100K	½	RCV-100K-P	EX-40	A47-100K-S	Q11-128	U41	AC Balance, Channel A
B	Shaft			Not Req.	FKS-1/4	Not Req.	Not Req.	
R8A	100K	½	RCV-100K-P	EX-40	A47-100K-S	Q11-128	U-51	AC Balance, Channel B
B	Shaft			Not Req.	FKS-1/4	Not Req.	Not Req.	

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS (IRC or EQUIVALENT)

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R9	100K	
R10	10meg	
R11	100K	
R12	560K	
R13	10K	
R14	47K	
R15	270K	
R16	2700Ω	
R17	2.2meg	
R18	270K	
R19	2700Ω	
R20	82K	
R21	100K	
R22	1meg	
R23	470K	
R24	3.3meg	
R25	10meg	
R26	2.2meg	
R27	2.2meg	
R28	100K 1W	
R29	1500Ω	
R30	100K	
R31	1meg	
R32	100K	
R33	100K 1W	
R34	1500Ω	
R35	22K	
R36	220K	
R37	100K 1W	
R38	220K	
R39	680Ω	
R40	10K	
R41	2.2meg	
R42	100K 1W	

ITEM No.	RATING	REMARKS
R43	1500Ω	
R44	270K	
R45	33K	
R46	1000Ω	
R47	470K	
R48	270Ω 1W	
R49	1000Ω	
R50	470K	
R51	270Ω 1W	
R52	100K	
R53	10meg	
R54	100K	
R55	560K	
R56	10K	
R57	47K	
R58	270K	
R59	2700Ω	
R60	2.2meg	
R61	270K	
R62	2700Ω	
R63	82K	
R64	100K	
R65	1meg	
R66	470K	
R67	3.3meg	
R68	10meg	
R69	2.2meg	
R70	2.2meg	
R71	100K 1W	
R72	1500Ω	
R73	100K	
R74	1meg	
R75	100K	
R76	100K 1W	

ITEM No.	RATING	REMARKS
R77	1500Ω	
R78	22K	
R79	220K	
R80	100K 1W	
R81	220K	
R82	680Ω	
R83	10K	
R84	2.2meg	
R85	100K 1W	
R86	270K	
R87	1500Ω	
R88	33K	
R89	1000Ω	
R90	470K	
R91	270Ω 1W	
R92	1000Ω	
R93	470K	
R94	270Ω 1W	
R95	1500Ω	
R96	15K	
R97	15K	
R98	47K	
R99	56K 1W	
R100	47K 1W	
R101	2200Ω 2W	
R102	2200Ω 2W	
R103	2200Ω 2W	
R104	80Ω 10W	IRC#PW10-80Ω
R105	33Ω 10W	IRC#PW10-33Ω
R106	1200Ω 7W	IRC#PW10-1.2KΩ
R107	680K	
R108	3.3Ω 1W	
R109	3.3Ω 1W	

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			H. H. SCOTT PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG	2½A 125V S/B	F-SB-2.5	XF-3AG	31302.5	342001	MDL2½	HKP

MISCELLANEOUS

ITEM No.	PART NAME	H. H. SCOTT PART No.	NOTES
M2	Switch	SRW-33-1	Input Selector (Rotary Type)
M3	Switch	SRW-27	Stereo Selector (Rotary Type)
M4	Switch	SS-22	Equalization (DPDT Slide Type)
M5	Switch	SS-22	Scratch Filter (DPDT Slide Type)
M6	Switch	SS-22	Volume-Loudness (DPDT Slide Type)

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	KN-P-6	Four Used
Knob	KN-P-8	Four Used

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA					NOTES
	PRI.	SEC. 1	SEC. 2	H. H. SCOTT PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	117V @ 1.15A	660VCT @ .180A	5V @ 1.9A	TR-12-7				R-20B	
	SEC. 3	SEC. 4	SEC. 5						
	6.3V @ 3.8A								

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA					NOTES
	PRI.	SEC.	H. H. SCOTT PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	9500Ω CT	16Ω Taps @ 8Ω, 4Ω	TRA-7-1					
T3	9500Ω CT	16Ω Taps @ 8Ω, 4Ω	TRA-7-1					

PHOTOFACT® Folder with CIRCUITRACE®

STEELMAN MODEL 705

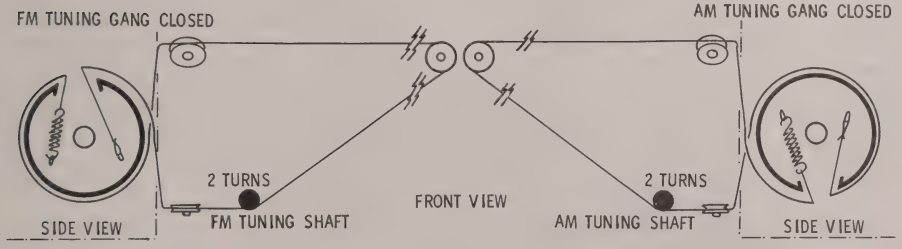
STEELMAN MODEL 705

STEELMAN MODEL 705

TRADE NAME	Steelman Model 705
MANUFACTURER	Steelman Phono & Radio Co., 2-30 Anderson Ave., Mount Vernon, N. Y.
TYPE SET	AC Operated 8 Tube FM-AM Tuner, 3 Tube Stereo Preamplifier, 5 Tube Stereo Amplifier, and 4 Speed Automatic Record Changer
POWER SUPPLY	110 - 120 Volts AC, 60 Cycles RATING 170 Watts, 1.6 Amp. @117 Volts (Total, Less Motor) 130 Watts, 1.2 Amp. @117 Volts AC (Amp. Only)
TUNING RANGE—BROADCAST	540 — 1600KC FREQ. MOD. 88 — 108MC

FOR SERVICE INFORMATION ON RECORD CHANGER PART #300416 — SEE GARRARD RC-88 — PHOTOFACT SET 338 FOLDER 5 OR RECORD CHANGER MANUAL CM-9

DIAL CORD STRINGING



HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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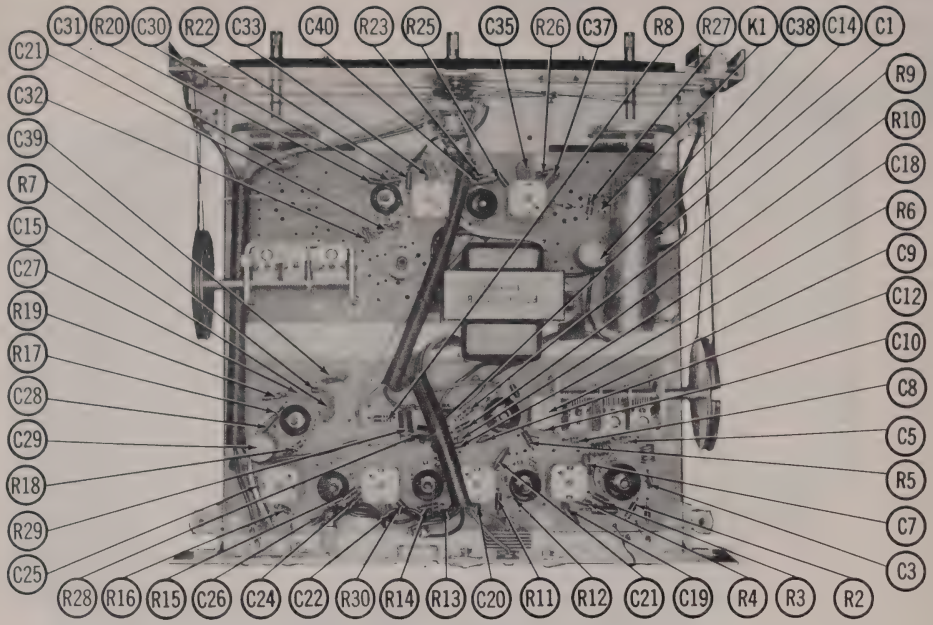
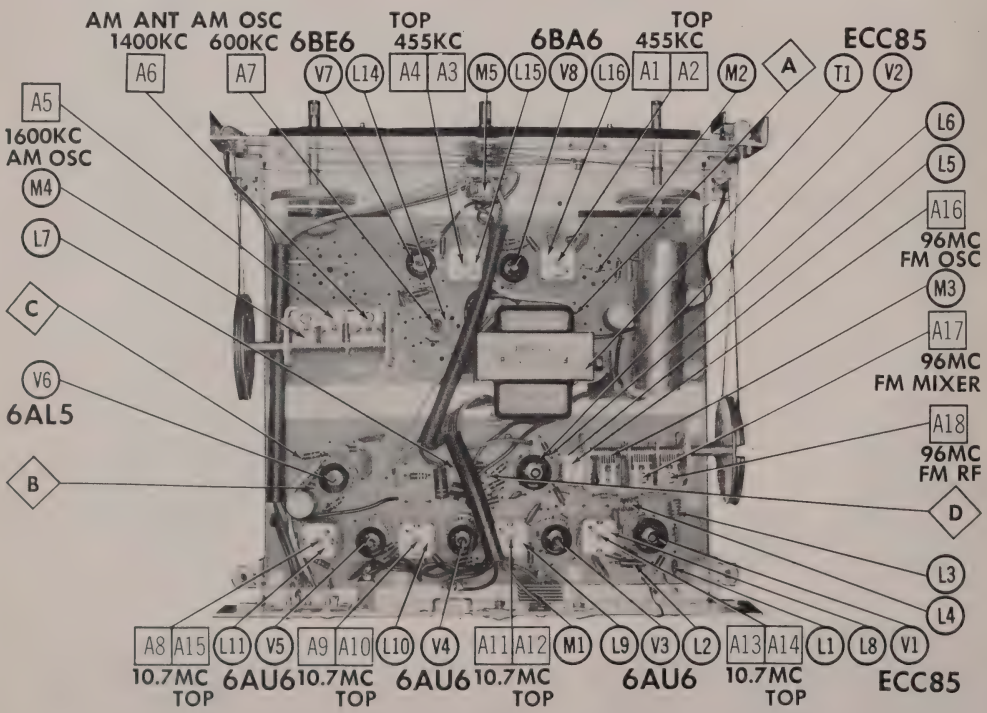
KN150

SET 520 FOLDER 11



TUNER CHASSIS - TOP VIEW



TUNER CHASSIS - TOP VIEW

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use only enough generator output to provide a usable indication.
Suggested Alignment Tools: A1 thru A4 and A8 thru A15...GENERAL CEMENT #5097, 8727
WALSCO #2515
A5, A6, A16, A17 and A18.....GENERAL CEMENT #5004, 5008, 5009
WALSCO #2520
A7..... GENERAL CEMENT #8282, 8606, 8606-L, 9295, 9440
WALSCO #2526, 2543, 2544, 2545

AM ALIGNMENT—SELECTOR IN AM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1.	High side thru .1mfd to pin 7 (grid) of AM Converter. Low side to chassis.	455KC (400∿ Mod.)	(AM) Tuning gang fully open.	AC probe to point (A). Common to chassis.	A1, A2, A3, A4	Adjust for maximum deflection.
2.	Loop	1600KC	1600KC	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.	"	1400KC	1400KC Signal.	"	A6	"
4.	"	600KC	600KC Signal.	"	A7	Adjust for maximum deflection.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM—SELECTOR IN FM POSITION

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
5.	High side thru .001mfd to pin 7 (grid) of FM Mixer. Low side to chassis.	10.7MC (Unmod.)	(FM) Point of non-interference.	DC probe thru 1meg to point (B). Common to chassis.	A8, A9, A10, A11, A12, A13, A14	Adjust for maximum deflection.
6.	"	"	"	DC probe to point (C). Common to chassis.	A15	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE—SELECTOR IN FM POSITION

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
5.	High side thru .001mfd to pin 7 (grid) of FM Mixer. Low side to chassis.	10.7MC (450KC Swp)	(FM) Point of non-interference.	Vert. amp. thru 47K to point (B). Low side to chassis.	A8, A9, A10, A11, A12, A13, A14	Adjust for maximum gain and symmetry of response similar to Fig. 1 with markers as shown.
6.	"	"	"	Vert. amp. to point (C). Low side to chassis.	A15	Adjust to place marker at the center of crossover lines similar to Fig. 2. SLIGHTLY retouch A8 for maximum amplitude and straightness of cross-over lines.

FM RF ALIGNMENT—SELECTOR IN FM POSITION

Short point (D) to chassis to disable A.F.C.

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
7.	High side thru 270Ω to FM antenna terminal. Low side to chassis.	96MC (Unmod.)	(FM) 96MC	DC probe to point (B). Common to chassis.	A16, A17, A18	Adjust for maximum output.

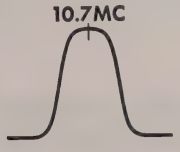


FIG. 1

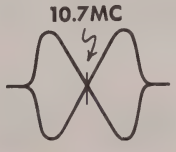
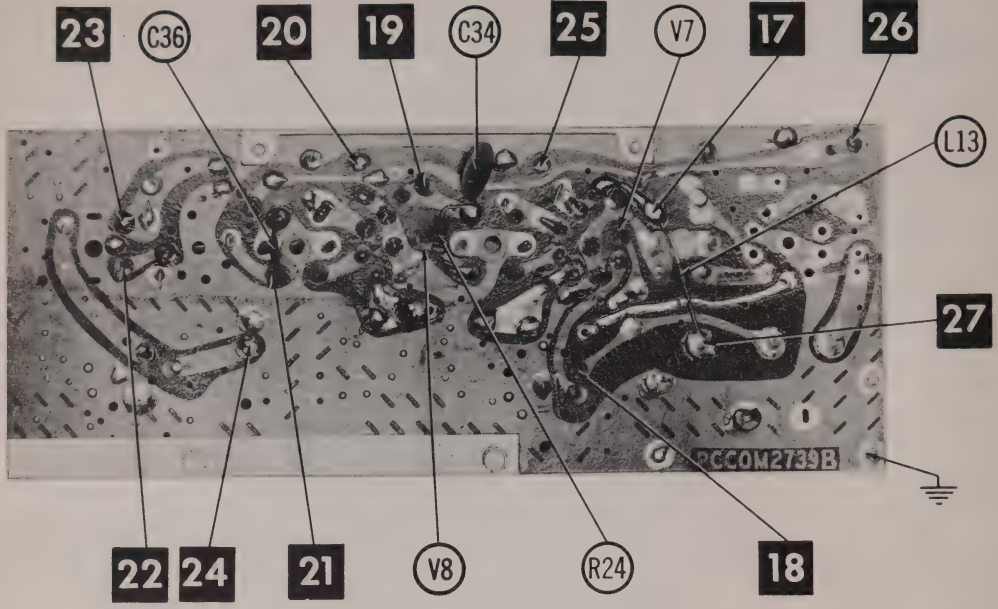


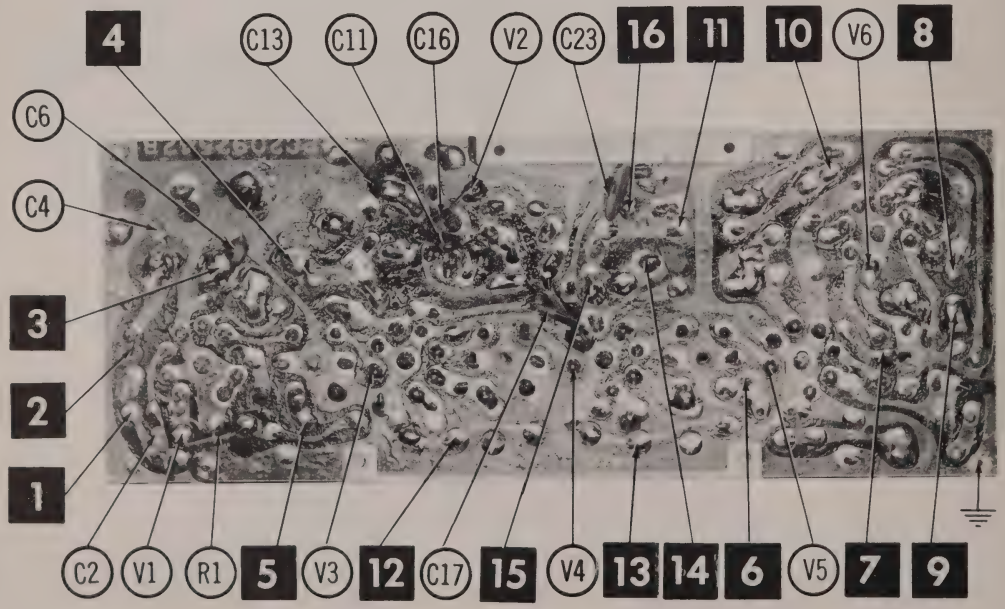
FIG. 2



A Howard W. Sams CIRCUITRACE Photo

AM PRINTED BOARD

ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED



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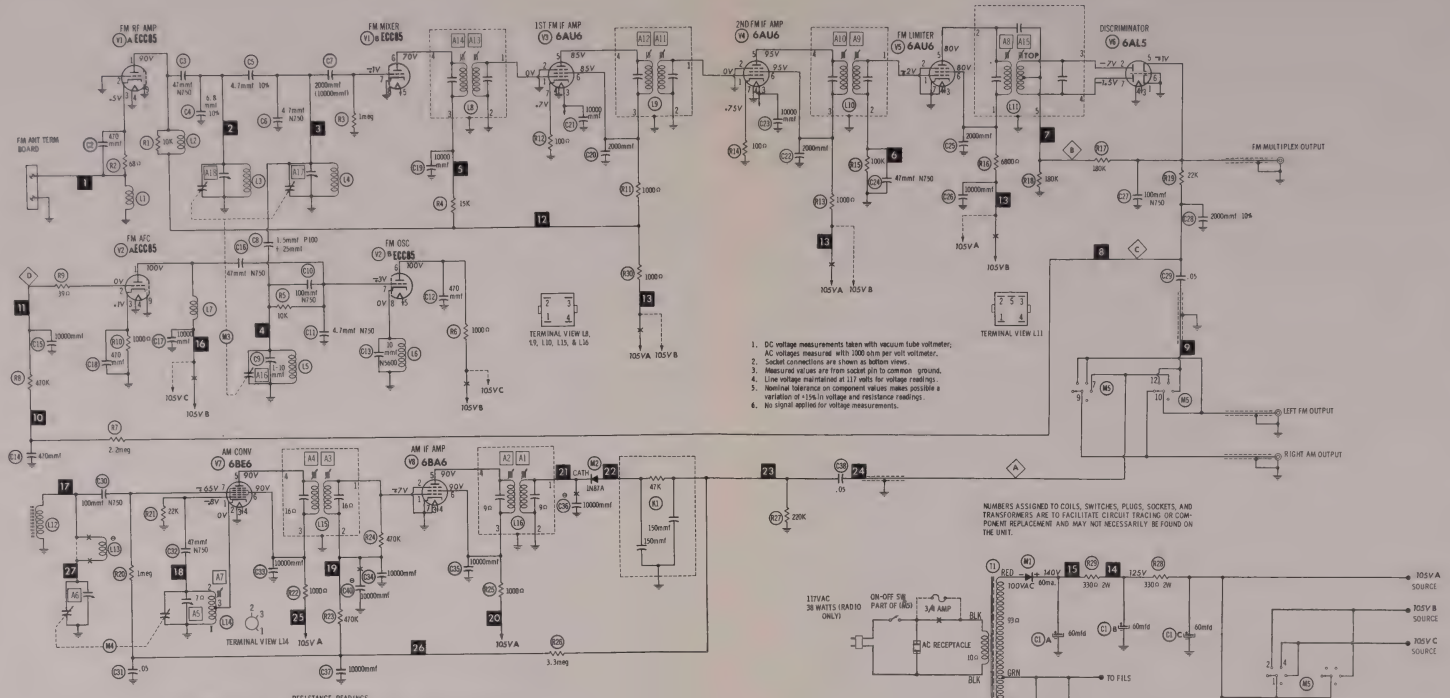
FM PRINTED BOARD

ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED


FM RF AMP
V1a ECC85
FM MIXER
V1b ECC85
1ST FM IF AMP
V3 6AU6
2ND FM IF AMP
V4 6AU6
FM LIMITER
V5 6AU6
DISCRIMINATOR
V6 6AL5
FM ANT TERM BOARD
FM AFC
V2a ECC85
FM OSC
V2b ECC85
AM CONV
V7 6BE6
AM IF AMP
V8 6BA6
TERMINAL VIEW L8, L9, L10, L15, & L16
TERMINAL VIEW L11
TERMINAL VIEW L34
FM MULTIPLEX OUTPUT
LEFT FM OUTPUT
RIGHT AM OUTPUT
105V A
105V B
105V C
1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured with 1000 ohm per volt voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common ground.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. No signal applied for voltage measurements.
NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.
117VAC 38 WATTS (RADIO ONLY)
ON-OFF SW PART OF (M5)
3A AMP
AC RECEPTACLE
TO FILS
SELECTOR SW (M5) SHOWN IN "OFF" POSITION. SW SEQUENCE: 1. OFF 2. FM 3. AM 4. STEREO
FM TUNING GANG
AM TUNING GANG
POWER TRANS
TUBE PLACEMENT BOTTOM VIEW

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	ECC85 6AQ8	††1660Ω	0Ω	68Ω	0Ω	.1Ω	††16K	1meg	0Ω	0Ω
V2	ECC85 6AQ8	††660Ω	3meg	1000Ω	0Ω	.1Ω	††1660Ω	10K	0Ω	0Ω
V3	6AU6	0Ω	0Ω	.1Ω	0Ω	††2600Ω	††2600Ω	100Ω		
V4	6AU6	0Ω	0Ω	.1Ω	0Ω	††1600Ω	††1600Ω	100Ω		
V5	6AU6	100K	0Ω	.1Ω	0Ω	††7400Ω	††7400Ω	0Ω		
V6	6AL6	0Ω	180K	.1Ω	0Ω	360K	0Ω	180K		
V7	6BE6	22K	.2Ω	0Ω	.1Ω	††1660Ω	††1660Ω	4.3meg		
V8	6BA6	3.9meg	0Ω	0Ω	.1Ω	††1660Ω	††1660Ω	0Ω		

†† MEASURED FROM OUTPUT OF M1.

● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUITRACE
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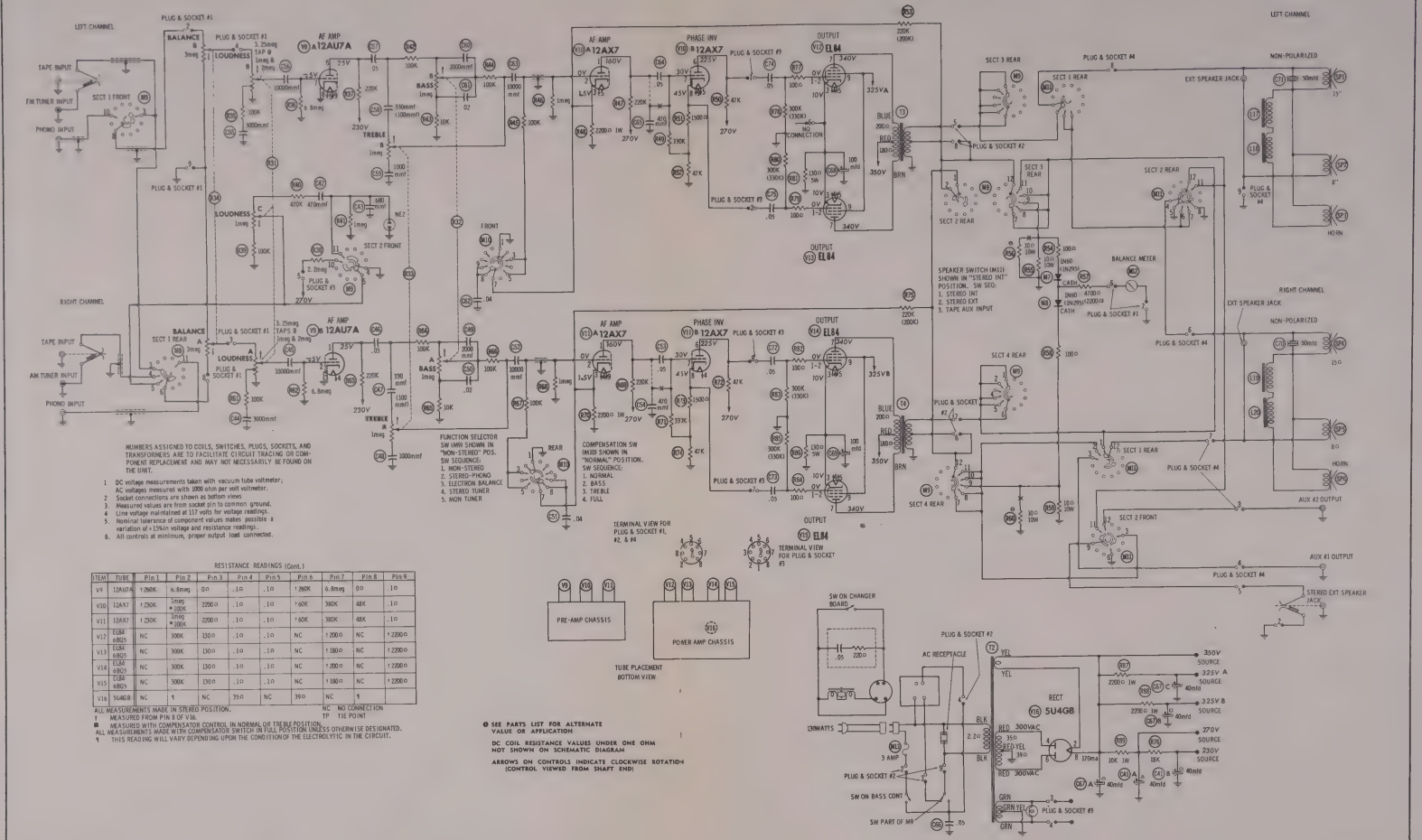
STEELMAN MODEL 705


LEFT CHANNEL
RIGHT CHANNEL
PLUG & SOCKET #1
PLUG & SOCKET #2
PLUG & SOCKET #3
PLUG & SOCKET #4
BALANCE
LOUDNESS
TREBLE
BASS
TAPE INPUT
FM TUNER INPUT
AM TUNER INPUT
PHONO INPUT
AF AMP
12AU7A
12AX7
PHASE INV
OUTPUT
EL84
SECT 1 FRONT
SECT 2 FRONT
SECT 3 REAR
SECT 4 REAR
SECT 1 REAR
SECT 2 REAR
FRONT
REAR
NON-POLARIZED
EXT SPEAKER JACK
HORN
BALANCE METER
AUX #1 OUTPUT
AUX #2 OUTPUT
STEREO EXT SPEAKER JACK
SPEAKER SWITCH (M13) SHOWN IN "STEREO INT" POSITION. SW SEQ:
1. STEREO INT
2. STEREO EXT
3. TAPE AUX INPUT
FUNCTION SELECTOR SW (M9) SHOWN IN "NON-STEREO" POS. SW SEQUENCE:
1. NON-STEREO
2. STEREO-PHONO
3. ELECTRON BALANCE
4. STEREO TUNER
5. NON TUNER
COMPENSATION SW (M10) SHOWN IN "NORMAL" POSITION. SW SEQUENCE:
1. NORMAL
2. BASS
3. TREBLE
4. FULL
NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.
1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured with 1000 ohm per volt voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common ground.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.
TERMINAL VIEW FOR PLUG & SOCKET #1, #2, & #4
TERMINAL VIEW FOR PLUG & SOCKET #3
PRE-AMP CHASSIS
POWER AMP CHASSIS
TUBE PLACEMENT BOTTOM VIEW
SW ON CHANGER BOARD
AC RECEPTACLE
RECT 5U4GB
SW ON BASS CONT
SW PART OF M9
350V SOURCE
325V A SOURCE
325V B SOURCE
270V SOURCE
230V SOURCE
SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

RESISTANCE READINGS (Cont.)

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V9	12AU7A	1.260K	6.8meg	0Ω	.1Ω	.1Ω	1.260K	6.8meg	0Ω	.1Ω
V10	12AX7	1.230K	1meg + 100K	220Ω	.1Ω	.1Ω	160K	380K	48K	.1Ω
V11	12AX7	1.230K	1meg + 100K	220Ω	.1Ω	.1Ω	160K	380K	48K	.1Ω
V12	EL84 6BQ5	NC	300K	130Ω	.1Ω	.1Ω	NC	1200Ω	NC	1220Ω
V13	EL84 6BQ5	NC	300K	130Ω	.1Ω	.1Ω	NC	1180Ω	NC	1220Ω
V14	EL84 6BQ5	NC	300K	130Ω	.1Ω	.1Ω	NC	1200Ω	NC	1220Ω
V15	EL84 6BQ5	NC	300K	130Ω	.1Ω	.1Ω	NC	1180Ω	NC	1220Ω
V16	5U4GB	NC	1	NC	350	NC	390	NC	1	

ALL MEASUREMENTS MADE IN STEREO POSITION.
1 MEASURED FROM PIN 8 OF V1A.
■ MEASURED WITH COMPENSATOR CONTROL IN NORMAL OR TREBLE POSITION.
ALL MEASUREMENTS MADE WITH COMPENSATOR SWITCH IN FULL POSITION UNLESS OTHERWISE DESIGNATED.
1 THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
NC NO CONNECTION
TP TIE POINT

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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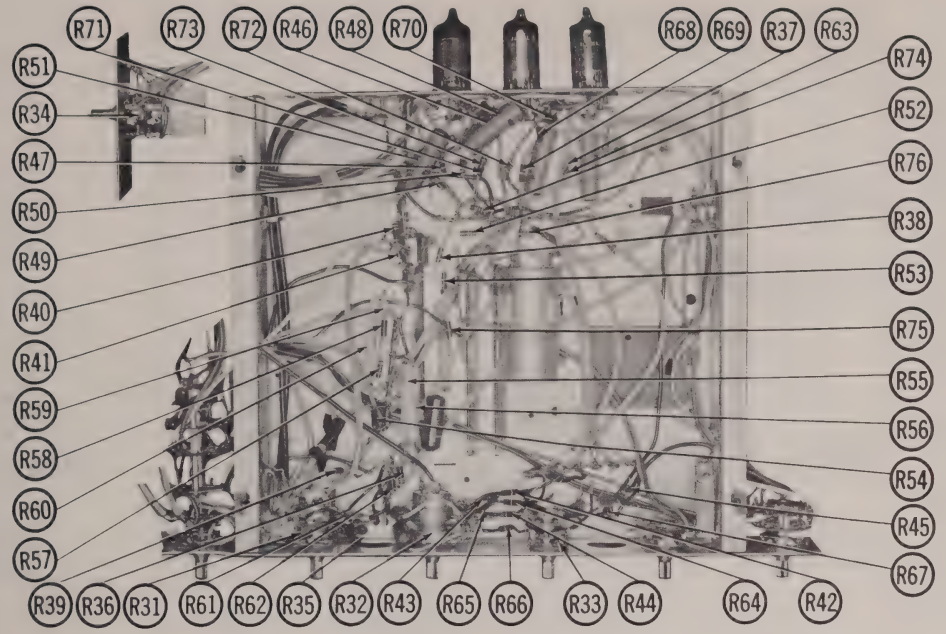
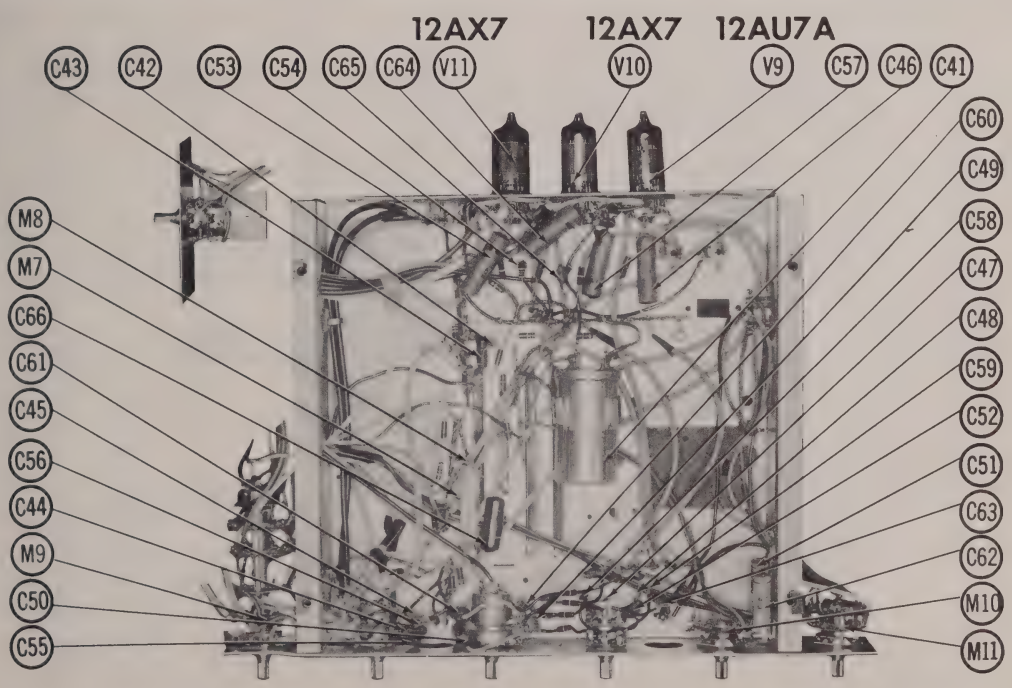
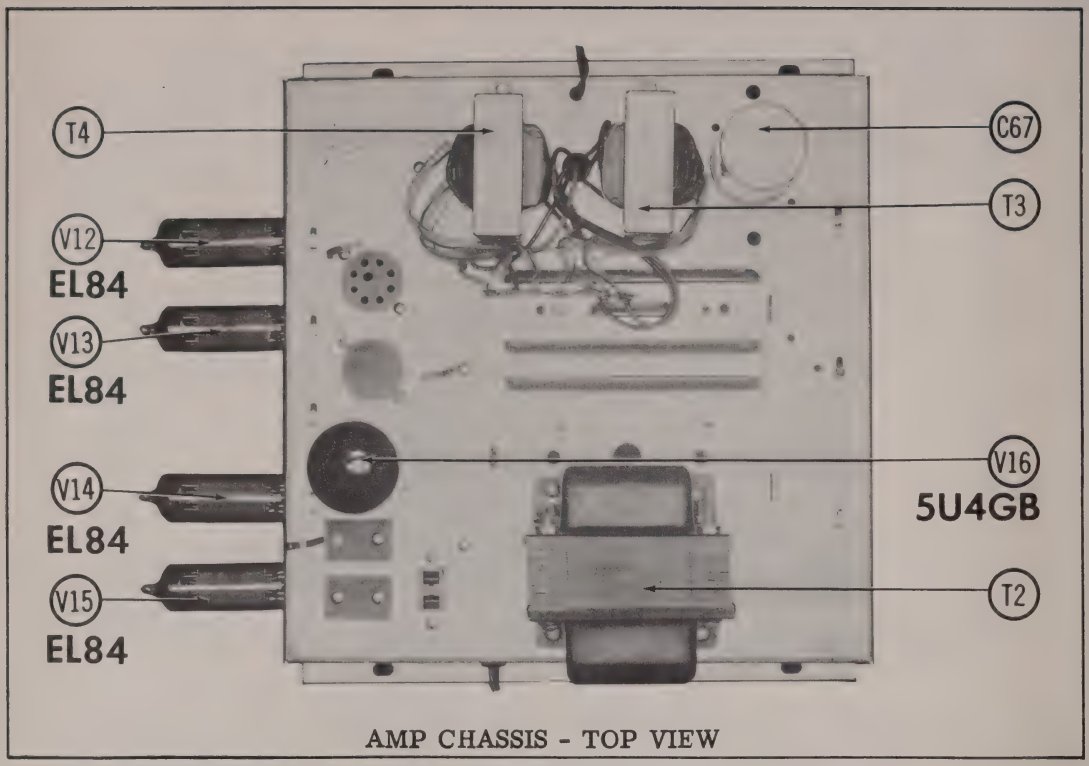
STEELMAN MODEL 705



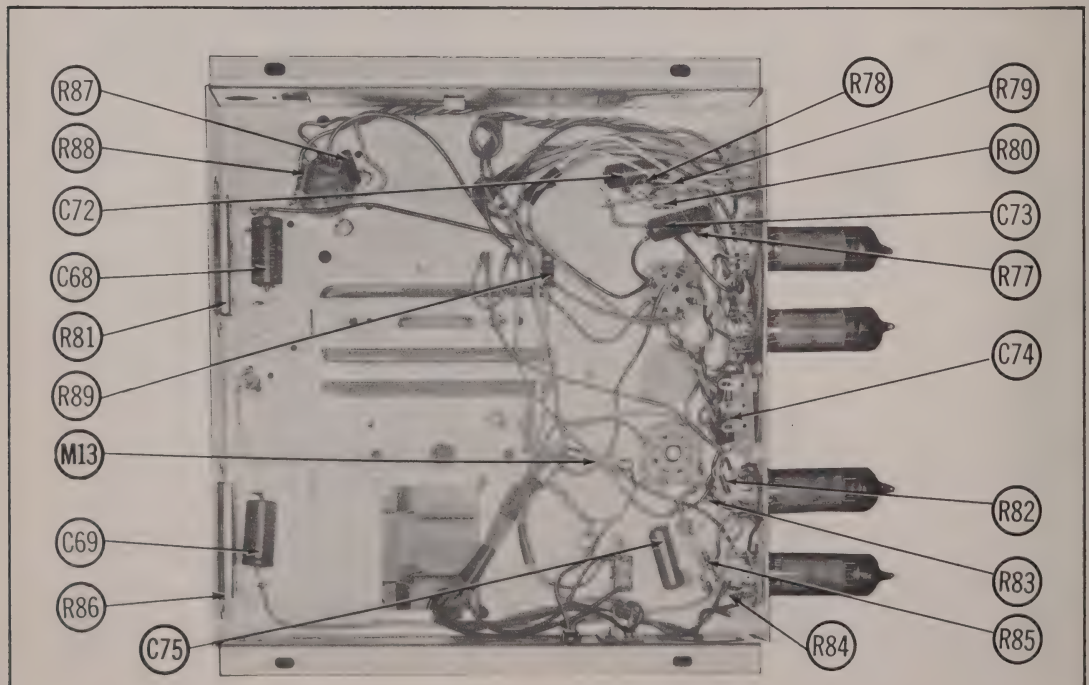
PREAMP CHASSIS - BOTTOM VIEW



PREAMP CHASSIS - BOTTOM VIEW



AMP CHASSIS - TOP VIEW



AMP CHASSIS - BOTTOM VIEW

TUNER PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No.	USE	TYPE (GENERAL ELECTRIC / RAYTHEON / SYLVANIA)
V1	FM RF Amp. -FM Mixer	ECC85/6AQ8
V2	FM Osc. -AFC	ECC85/6AQ8
V3	1st FM IF Amplifier	6AU6
V4	2nd FM IF Amplifier	6AU6
V5	FM Limiter	6AU6
V6	Discriminator	6AL5
V7	AM Converter	6BE6
V8	AM IF Amplifier	6BA6

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA STEELMAN PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	60	200		PR3-020	BBRQ55515C	WT458		TVAS-3567 *	
B	60	200							
C	60	200							

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C2	470		BPD-00047	DD-471	BYA10T47	CCD-471	B-347	10TS-T47
C3	47 N750		N750-DI 47	DTN-47	C10Q47U	CCTN-470	CN7-447	10TCU-Q47
C4	6.8 10%		NPO-SI 6.8	TCZ-6R8	C10V68C	CCTO-6R8	CNO-568	10TCC-V68
C5	4.7 10%		NPO-SI 4.7	TCZ-4R7	C10V47C	CCTO-4R7	CNO-547	10TCC-V47
C6	4.7 N750			DTN-5	C10V5U	CCTN-050	CN7-547	10TCU-V50
C7	2000	(10000) †	BPD-002	DD-202	BYA10D2	CCD-202	B-220	5HK-D20
C8	1.5 P100 ± .25mmf							
C9	1-10			829-10				
C10	100 N750		N750-DI 100	DTN-100	C10T1U	CCTN-101	CN7-310	10TCU-T10
C11	4.7 N750			DTN-5	C10V5U	CCTN-4R7	CN7-547	10TCU-V5
C12	470		BPD-00047	DD-471	BYA10T47	CCD-471	B-347	10TS-T47
C13	10 N5600					*		
C14	470		BPD-00047	DD-471	BYA10T47	CCD-471	B-347	10TS-T47
C15	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C16	47 N750		N750-DI 47	DTN-47	C10Q47U	CCTN-470	CN7-447	10TCU-Q47
C17	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C18	470		BPD-00047	DD-471	BYA10T47	CCD-471	B-347	10TS-T47
C19	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C20	2000		BPD-002	DD-202	BYA10D2	CCD-202	B-220	5HK-D20
C21	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C22	2000		BPD-002	DD-202	BYA10D2	CCD-202	B-220	5HK-D20
C23	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C24	47 N750		N750-DI 47	DTN-47	C10Q47U	CCTN-470	CN7-447	10TCU-Q47
C25	2000		BPD-002	DD-202	BYA10D2	CCD-202	B-220	5HK-D20
C26	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C27	100 N750		N750-DI 100	DTN-100	C10T1U	CCTN-101	CN7-310	10TCU-T10
C28	2000 10%		DI-2000		5R5D2	CCD-202	JL-220	10TS-D20
C29	.05 200V		P2151N-047	DD-503	BC2S47J	4DP-3-503	ACE6147	2SE-S47
C30	100 N750		N750-DI 100	DTN-100	C10T1U	CCTN-101	CN7-310	10TCU-T10
C31	.05 400V		P488N-05	DD-503	CUB4S5	4DP-3-503	GEM-415	4TM-S50
C32	47 N750		N750-DI 47	DTN-47	C10Q47U	CCTN-470	CN7-447	10TCU-Q47
C33	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C34	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C35	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C36	10000	Note 1	BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C37	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C38	.05 200V		P2151N-047	DD-503	BC2S47J	4DP-3-503	ACE6147	2SE-S47
C39	10000	Note 1	BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C40	10000	Note 1	BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10

Note 1. Not used in some versions.
* Not normally in distributor's stock. Available thru distributor on order to manufacturer.
† Alternate Value.

RESISTORS (IRC or EQUIVALENT)

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R1	10K	
R2	68Ω	
R3	1meg	
R4	15K	
R5	10K	
R6	1000Ω	
R7	2.2meg	
R8	470K	
R9	39Ω	
R10	1000Ω	

ITEM No.	RATING	REMARKS
R11	1000Ω	
R12	100Ω	
R13	1000Ω	
R14	100Ω	
R15	100K	
R16	6800Ω	
R17	180K	
R18	180K	
R19	22K	
R20	1meg	

ITEM No.	RATING	REMARKS
R21	22K	
R22	1000Ω	
R23	470K	
R24	470K	
R25	1000Ω	
R26	3.3meg	
R27	220K	
R28	330Ω 2W	
R29	330Ω 2W	
R30	1000Ω	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	STEELMAN PART No.	REPLACEMENT DATA	
K1	AM Diode RF Filter	150mmf, 150mmf, 47K		Aerovox	PA-98
				Centralab	PC-51
				Cornell-Dubilier	1liTM2
				Sprague	D-2

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA STEELMAN PART No.	Merit PART No.	Miller PART No.	Stancor PART No.	NOTES
L1	FM Ant. Coil			4584	RTC-8512	.24uh
L2	RF Choke		BC-564	4608	RTC-8518	3.3uh
L3	FM RF Coil					
L4	FM Mixer Coil					
L5	FM Osc. Coil					
L6	Cathode Choke		BC-561	4602	RTC-8515	1uh
L7	RF Choke		BC-564	4608	RTC-8518	3.3uh
L8	1st FM IF Trans.		FM-256	1463-PC	RTC-9046	
L9	2nd FM IF Trans.		FM-256	1463-PC	RTC-9046	
L10	3rd FM IF Trans.		FM-256	1463-PC	RTC-9046	
L11	Discriminator					
L12	Loopstick		BC-419	705-A		
L13	RF Choke			4584	RTC-8512	.24uh
L14	AM Osc. Coil					
L15	1st AM IF Trans.		BC-356	13-PC1	RTC-8641	
L16	2nd AM IF Trans.		BC-357	13-PC2	RTC-8642	

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	REPLACEMENT DATA STEELMAN PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	117V@ .37A	120V@.060A Tap@6.3V @2.6A						

POWER RECTIFIERS

ITEM No.	RATING CURRENT (Measured)	REPLACEMENT DATA STEELMAN PART No.	RCA PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	NOTES	
M1	.060A		1N1763♦	75A*	SR200♦	♦ Silicon	* Selenium

TUNER PARTS LIST AND DESCRIPTIONS (Continued)

SIGNAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA				NOTES
		STEELMAN PART No.	GENERAL ELECTRIC PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
M2	1N87A			1N87A	1N87A	AM Detector

MISCELLANEOUS

ITEM No.	PART NAME	STEELMAN PART No.	NOTES
M3	Tuning Cap.		FM, 3 Gang
M4	Tuning Cap.		AM, 3 Gang
M5	Switch		Function (Rotary Wafer Type)

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

PREAMP PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No.	USE	TYPE (• GENERAL ELECTRIC • RAYTHEON • SYLVANIA •)
V9	Left Channel AF Amp. - Right Channel AF Amp.	12AU7A
V10	Left Channel AF Amp. - Left Channel Phase Inv.	12AX7
V11	Right Channel AF Amp. Right Channel Phase Inv.	12AX7

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	STEELMAN PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C41A	▲40	350	582011	AFH2-57	B0450	FP238	TMD-2390	TVL-2764	
B	▲40	350							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C42	470		BPD-00047	DD-471	BYA10T47	CCD-471	B-347	10TS-T47
C43	680		1468-00068	D6-681	5W5T68	CM-19B-681M	B-368	10TS-T68
C44	3000		SI 3000	D6-302	BYA10D3	CCD-302	GP230	10TS-D30
C45	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C46	.05	400V	P488N-05	DD-503	CUB4S5	4DP-3-503	GEM-415	4TM-S50
C47	330	(100) †	BPD-00033	DD-331	L10T33	CCD-331	B-333	10TS-T33
C48	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C49	2000		BPD-002	DD-202	BYA10D2	CCD-202	B-220	5HK-D20
C50	.02	400V	P488N-02	DD-203	CUB4S2	4DP-2-203	GEM-412	4TM-S20
C51	.04	200V	P288N-04	DD-403	CUB6S4	4DP-3-403	GEM-414	4TM-S40
C52	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C53	.05	400V	P488N-05	DD-503	CUB4S5	4DP-3-503	GEM-415	4TM-S50
C54	470		BPD-00047	DD-471	BYA10T47	CCD-471	B-347	10TS-T47
C55	3000		SI 3000	D6-302	BYA10D3	CCD-302	GP230	10TS-D30
C56	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C57	.05	400V	P488N-05	DD-503	CUB4S5	4DP-3-503	GEM-415	4TM-S50
C58	330	(100) †	BPD-00033	DD-331	L10T33	CCD-331	B-333	10TS-T33
C59	1000		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C60	2000		BPD-002	DD-202	BYA10D2	CCD-202	B-220	5HK-D20
C61	.02	400V	P488N-02	DD-203	CUB4S2	4DP-2-203	GEM-412	4TM-S20
C62	.04	200V	P288N-04	DD-403	CUB6S4	4DP-3-403	GEM-414	4TM-S40
C63	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C64	.05	400V	P488N-05	DD-503	CUB4S5	4DP-3-503	GEM-415	4TM-S50
C65	470		SI 470	DD-471	BYA10T47	CCD-471	B-347	10TS-T47
C66	.05	400V	P488N-05	DD-503	CUB4S5	4DP-3-503	GEM-415	4TM-S50

† Alternate Value.

PREAMP PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	STEELMAN PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R31A	3.25meg*		368071					Loudness, Right Channel
B	3.25meg*							Loudness, Left Channel
C	1meg							Loudness, Center Channel
B32A	1meg		368072	B-69	AD47-1meg-S		FA16L	Bass, Left Channel
B	1meg			SR-69	Not Req.		RU16L	Bass, Right Channel
C	Shaft			Not Req.	KSS-3		CS3500	
D	Switch			KR-1	SWE-12		US41	
R33A	1meg		368074	B-69	AD47-1meg-S		FA16L	Treble, Left Channel
B	1meg			SR-69	Not Req.		RU16L	Treble, Right Channel
C	Shaft			Not Req.	KSS-3		CS3500	
R34A	3meg		368062					Balance, Left Channel
B	3meg							Balance, Right Channel

* Taps ⓐ 1meg & 2meg. (2meg Taps not used).

RESISTORS (IRC or EQUIVALENT)

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R35	100K	
R36	6.8meg	
R37	220K	
R38	2.2meg	
R39	100K	
R40	470K	
R41	1meg	
R42	100K	
R43	10K	
R44	100K	
R45	100K	
R46	1meg	
R47	220K	
R48	2200Ω 1W	
R49	330K	
R50	47K	

ITEM No.	RATING	REMARKS
R51	1500Ω	
R52	47K	
R53	220K	(200K) *
R54	100Ω	
R55	10Ω 10W	Pt. #510038 IRC#PW10-10Ω
R56	10Ω 10W	Pt. #510038 ① IRC#PW10-10Ω
R57	4700Ω	(2200Ω) *
R58	100Ω	
R59	10Ω 10W	Pt. #510038 IRC#PW10-10Ω
R60	10Ω 10W	Pt. #510038 ① IRC#PW10-10Ω
R61	100K	
R62	6.8meg	

ITEM No.	RATING	REMARKS
R63	220K	
R64	100K	
R65	10K	
R66	100K	
R67	100K	
R68	1meg	
R69	220K	
R70	2200Ω 1W	
R71	330K	
R72	47K	
R73	1500Ω	
R74	47K	
R75	220K	(200K) *
R76	18K	

* Alternate Value. ① Not used in some versions.

PHONO CARTRIDGE & NEEDLES

*NEEDLE LISTINGS SHOWN ARE FOR RESPECTIVE REPLACEMENT CARTRIDGES ONLY.

ITEM No.	REPLACEMENT DATA								NOTES
	STEELMAN PART No.		ASTATIC PART No.		ELECTRO-VOICE PART No.		SONOTONE PART No.		
	CARTRIDGE	NEEDLE*	CARTRIDGE	NEEDLE*	CARTRIDGE	NEEDLE*	CARTRIDGE	NEEDLE*	
M6	324521	Not Req.	13TBX	Not Req.	26SD	Not Req.	8TA4-SD	N-8TA-SD *	

SIGNAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA				NOTES
		STEELMAN PART No.	GENERAL ELECTRIC PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
M7	1N60*	359004		1N60	1N60	* Alternate Type 1N295
M8	1N60*	359004		1N60	1N60	

MISCELLANEOUS

ITEM No.	PART NAME	STEELMAN PART No.	NOTES
M9	Switch	370059	Function (Rotary)
M10	Switch	370053	Compensating (Rotary)
M11	Switch	370060	Speaker Selector (Rotary)
M12	Meter	830150	

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No. 1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No. 8401
Phono Pick-up Arm Cable	Use BELDEN No. 8430 (Two Conductor - Twisted)

AMP PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No.	USE	TYPE (GENERAL ELECTRIC • RAYTHEON • SYLVANIA)
V12	Left Channel Output	EL84/6BQ5
V13	Left Channel Output	EL84/6BQ5
V14	Right Channel Output	EL84/6BQ5
V15	Right Channel Output	EL84/6BQ5
V16	Rectifier	5U4GB

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	STEELMAN PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C67A	▪40	450	583026	AFH3-44	C0350	FP377	TMT-3748	TVL-3787	
B	▪40	450							
C	40	450							
C68	100	25	581027	PRS1270	BBR100-25	TC2501	TD-100-25	TVA-1207	
C69	100	25	581027	PRS1270	BBR100-25	TC2501	TD-100-25	TVA-1207	
C70	50	50NP	581048	PRS7450	BR5015	TC3501 †		TVANS-1440*	
C71	50	50NP	581048	PRS7450	BR5015	TC3501 †		TVANS-1440*	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.
† Use 2 units. Connect negative terminals together. Connect positive terminals into circuit the same as the original non-polarized unit.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C72	.05 400V		P488N-05	DD-503	CUB4S5	4DP-3-503	GEM-415	4TM-S50
C73	.05 400V		P488N-05	DD-503	CUB4S5	4DP-3-503	GEM-415	4TM-S50
C74	.05 400V		P488N-05	DD-503	CUB4S5	4DP-3-503	GEM-415	4TM-S50
C75	.05 400V		P488N-05	DD-503	CUB4S5	4DP-3-503	GEM-415	4TM-S50

RESISTORS (IRC or EQUIVALENT)

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R77	100Ω	
R78	300K	(330K) *
R79	100Ω	
R80	300K	(330K) *
R81	130Ω 5W	Pt. #510015 IRC#PW5-130Ω
R82	100Ω	
R83	300K	(330K) *
R84	100Ω	
R85	300K	(330K) *
R86	130Ω 5W	Pt. #510015 IRC#PW5-130Ω
R87	2200Ω 1W	
R88	2200Ω 1W	
R89	10K 1W	

* Alternate Value.

CROSSOVER CHOKE

ITEM No.	RATINGS CURRENT (Measured)	RATINGS DC RES.	RATINGS INDUCTANCE (0 CURRENT 1000 ∿)	STEELMAN PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
L17		.3Ω	250uh	455071					
L18		.3Ω	250uh	455071					
L19		.3Ω	250uh	455071					
L20		.3Ω	250uh	455071					

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	STEELMAN PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	117V ⓐ 1.2A	600VCT ⓐ .170A	5V ⓐ 3A	440020					
	SEC. 3	SEC. 4	SEC. 5						
	6.3VCT ⓐ 4.1A								

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	STEELMAN PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T3	5100Ω CT	6-8Ω CT	430565					
T4	5100Ω CT	6-8Ω CT	430565					

SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	STEELMAN PART No.	QUAM PART No.	NOTES
SP1	15"	PM	6-8Ω	409015	15A10L	
SP2	8"	PM	6-8Ω	408007	8A31Z7.6	
SP3	Horn	PM	14-16Ω	409016		
SP4	15"	PM	6-8Ω	409015	15A10L	
SP5	8"	PM	6-8Ω	408007	8A31Z7.6	
SP6	Horn	PM	14-16Ω	409016		

FUSES

ITEM No.	TYPE	RATING	STEELMAN PART No. FUSE	STEELMAN PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M13	3AG	3A 125V	357006		315003 (3AG 3A 125V)		MDV3	

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	272348	Tuning, Balance
Knob	272349	Function Selector, Tuner
Knob	272355	Loudness, Bass, Treble, Compensator, Function, Speaker Selector
Cabinet	211300	Mahogany
Cabinet	211302	Walnut
Cabinet	211301	Limed Oak
Cabinet	211309	Cherry
Cabinet	211304	Ebony
Cabinet	211310	French Provincial

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

PHOTOFACT® Folder

STROMBERG-CARLSON
MODEL ASR-333

STROMBERG-CARLSON
MODEL ASR-333

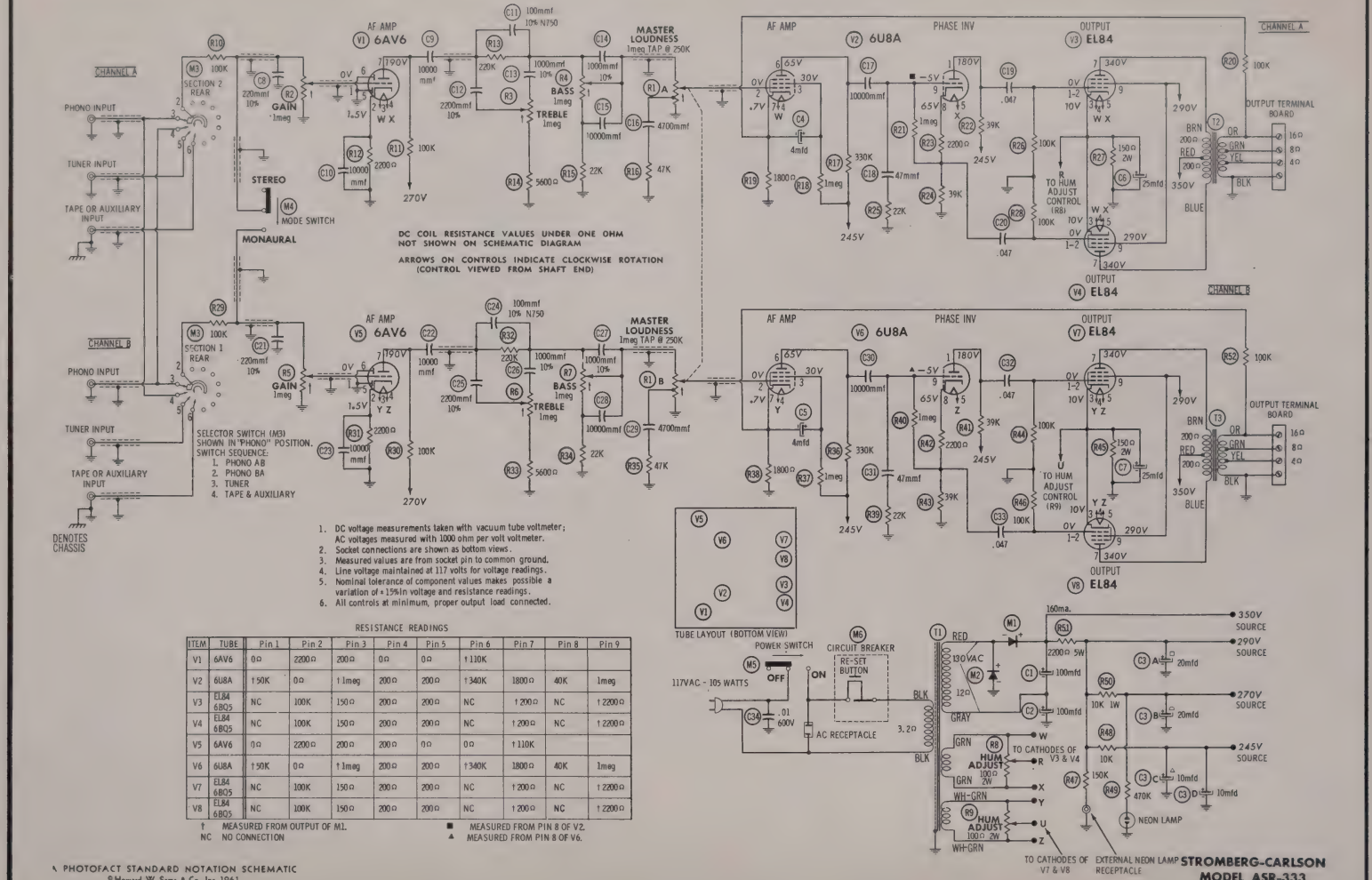
STROMBERG-CARLSON
MODEL ASR-333

TRADE NAME	Stromberg-Carlson Model ASR-333
MANUFACTURER	Stromberg-Carlson Co., A Div. of General Dynamics Corp., Commercial Products Div., 1400 N. Goodman Street, Rochester 9, N. Y.
TYPE SET	AC Operated 8 Tube Stereo Amplifier
POWER SUPPLY	110 - 120 Volts AC, 60 Cycles RATING 105 Watts, 1.1 Amp. @117 Volts AC

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1961 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

KV216



1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured with 1000 ohm per volt voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common ground.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6AV6	0Ω	2200Ω	200Ω	0Ω	0Ω	†110K			
V2	6U8A	†50K	0Ω	†1meg	200Ω	200Ω	†340K	1800Ω	40K	1meg
V3	EL84 6BQ5	NC	100K	150Ω	200Ω	200Ω	NC	†200Ω	NC	†2200Ω
V4	EL84 6BQ5	NC	100K	150Ω	200Ω	200Ω	NC	†290Ω	NC	†2200Ω
V5	6AV6	0Ω	2200Ω	200Ω	200Ω	0Ω	0Ω	†110K		
V6	6U8A	†50K	0Ω	†1meg	200Ω	200Ω	†340K	1800Ω	40K	1meg
V7	EL84 6BQ5	NC	100K	150Ω	200Ω	200Ω	NC	†200Ω	NC	†2200Ω
V8	EL84 6BQ5	NC	100K	150Ω	200Ω	200Ω	NC	†200Ω	NC	†2200Ω

† MEASURED FROM OUTPUT OF M1.
NC NO CONNECTION
■ MEASURED FROM PIN 8 OF V2.
▲ MEASURED FROM PIN 8 OF V6.

PHOTOFACT STANDARD NOTATION SCHEMATIC

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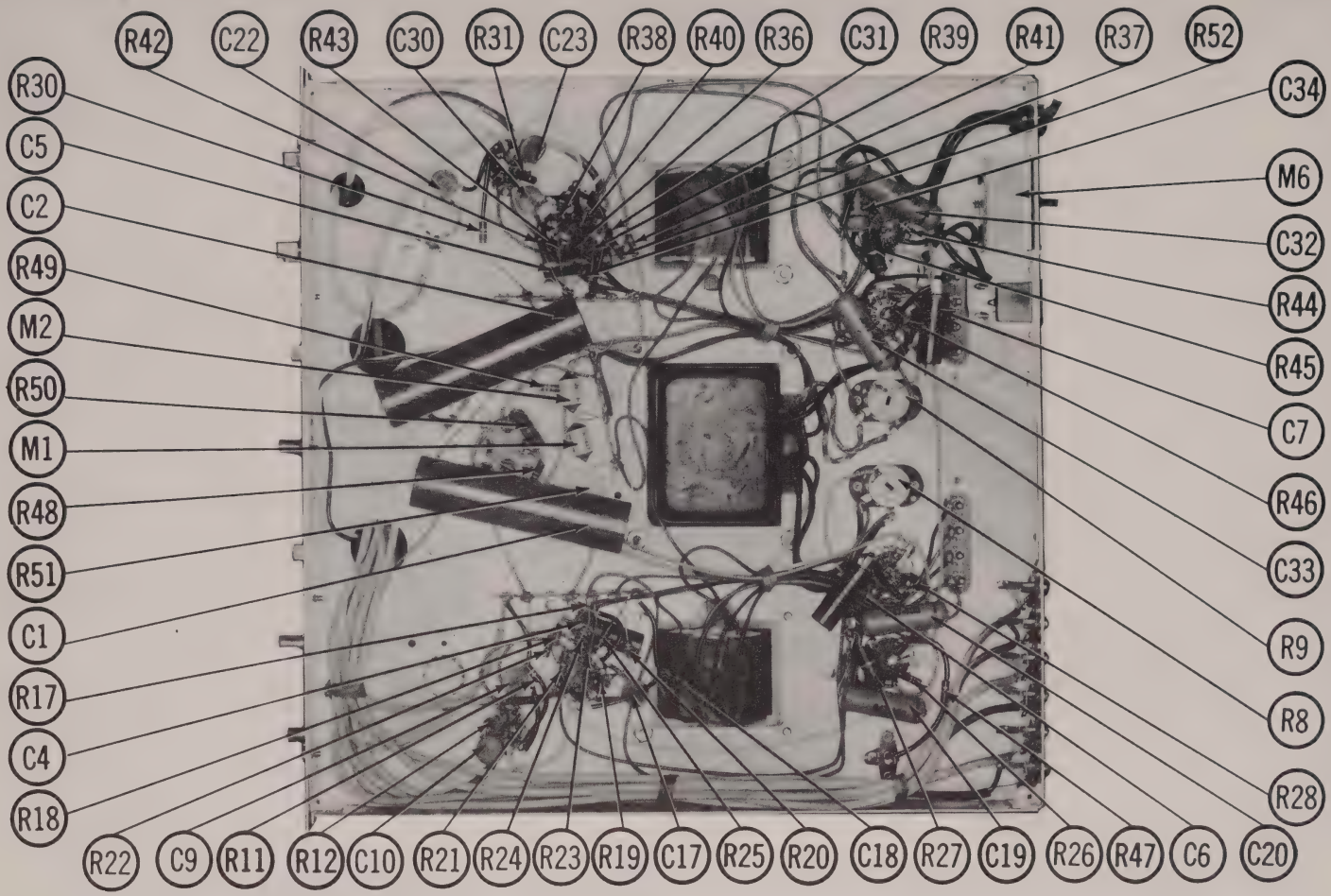
STROMBERG-CARLSON MODEL ASR-333



CHASSIS-BOTTOM VIEW

PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No.	USE	TYPE (GENERAL ELECTRIC • RAYTHEON • SYLVANIA)
V1	Channel A AF Amp.	6AV6
V2	Channel A AF Amp. - Phase Inverter	6U8A
V3	Channel A Output	EL84/6BQ5
V4	Channel A Output	EL84/6BQ5
V5	Channel B AF Amp.	6AV6
V6	Channel B AF Amp. - Phase Inverter	6U8A
V7	Channel B Output	EL84/6BQ5
V8	Channel B Output	EL84/6BQ5

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	Stromberg-Carlson PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1	100	250	111000-077	PRS1595	BR10035	TC1265	TD-100-250	TVA-1718	
C2	100	250	111000-077	PRS1595	BR10035	TC1265	TD-100-250	TVA-1718	
C3A	■20	450	111000-040	AFH4-19-10	D0179.3	FP474.5	TMQ-4616	TVL-4832	
B	▲20	450							
C	▲10	400							
D	10	400							
C4	4	150	111000-050	PRS1400	BBR4-150	TT150X4	TD-4-150	TVA-1402	
C5	4	150	111000-050	PRS1400	BBR4-150	TT150X4	TD-4-150	TVA-1402	
C6	25	25	111000-009	PRS1260	BBR25-25	TC26	TD-25-25	TVA-1205	
C7	25	25	111000-009	PRS1260	BBR25-25	TC26	TD-25-25	TVA-1205	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C8	220 10%		DI-220	DD-221	L10T22	CCD-221	GP322	10TS-T22
C9	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C10	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C11	100 N750 10%		N750-DI 100	DTN-100	C10T1U	CCTN-101	CN7-310	10TCU-T10
C12	2200 10%		DI-2200			CCD-222	GP222	10TS-D22
C13	1000 10%		DI-1000	DD-102		CCD-102	GP210	10TS-D10
C14	1000 10%		DI-1000	DD-102		CCD-102	GP210	10TS-D10
C15	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C16	4700		BPD-0047	DD-472	BYA10D47M	CCD-472	B-247	5HK-D47
C17	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C18	47		DI-47	DD-470	L10Q47	CCD-470	GP447	10TS-Q47

FIXED CAPACITORS (cont)

ITEM No.	RATING	REMARKS	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C19	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C20	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C21	220 10%		DI-220	DD-221	L10T22	CCD-221	GP322	10TS-T22
C22	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C23	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C24	100 N750 10%		N750-DI 100	DTN-100	C10T1U	CCTN-101	CN7-310	10TCU-T10
C25	2200 10%		DI-2200			CCD-222	GP222	10TS-D22
C26	1000 10%		DI-1000	DD-102		CCD-102	GP210	10TS-D10
C27	1000 10%		DI-1000	DD-102		CCD-102	GP210	10TS-D10
C28	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C29	4700		BPD-0047	DD-472	BYA10D47M	CCD-472	B-247	5HK-D47
C30	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C31	47		DI-47	DD-470	L10Q47	CCD-470	GP447	10TS-Q47
C32	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C33	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C34	.01 600V		P688N-01	D6-103	CUB6S1	6DP-2-103	GEM-611	6TM-S10

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	Stromberg-Carlson PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1meg	½	145000-053	BT-167 *			FC16T254	Master Loudness, Channel B
	250K Tap							
B	1meg	½		STR-167 *			RU16T254	Master Loudness, Channel A
	250K Tap							
C	Shaft			Not Req.			CS3500	
R2A	1meg	½	145000-072	B-70	A47-1meg-Z	Q13-137	U53	Gain, Channel A
B	Shaft			Not Req.	FS-3	Not Req.		
R3A	1meg	½	145000-072	B-70	A47-1meg-Z	Q13-137	U53	Treble, Channel A
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R4A	1meg	½	145000-072	B-70	A47-1meg-Z	Q13-137	U53	Bass, Channel A
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R5A	1meg	½	145000-072	B-70	A47-1meg-Z	Q13-137	U53	Gain, Channel B
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R6A	1meg	½	145000-072	B-70	A47-1meg-Z	Q13-137	U53	Treble, Channel B
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R7A	1meg	½	145000-072	B-70	A47-1meg-Z	Q13-137	U53	Bass, Channel B
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R8A	100Ω	2(WW)	173853-000	WN-101	A43-100	W11-084	FL100P	Hum Adjust, Channel A
B	Shaft			Not Req.	FKS-1/4	SK5	Not Req.	
R9A	100Ω	2(WW)	173853-000	WN-101	A43-100	W11-084	FL100P	Hum Adjust, Channel B
B	Shaft			Not Req.	FKS-1/4	SK5	Not Req.	

* Do not use tap #2.

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS (IRC or EQUIVALENT)

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R10	100K	
R11	100K	
R12	2200Ω	
R13	220K	
R14	5600Ω	
R15	22K	
R16	47K	
R17	330K	
R18	1meg	
R19	1800Ω	
R20	100K	
R21	1meg	
R22	39K	
R23	2200Ω	
R24	39K	

ITEM No.	RATING	REMARKS
R25	22K	
R26	100K	
R27	150Ω 2W	
R28	100K	
R29	100K	
R30	100K	
R31	2200Ω	
R32	220K	
R33	5600Ω	
R34	22K	
R35	47K	
R36	330K	
R37	1meg	
R38	1800Ω	
R39	22K	

ITEM No.	RATING	REMARKS
R40	1meg	
R41	39K	
R42	2200Ω	
R43	39K	
R44	100K	
R45	150Ω 2W	
R46	100K	
R47	150K	
R48	10K	
R49	470K	
R50	10K 1W	
R51	2200Ω 5W	IRC#PW5-2200Ω
R52	100K	

POWER RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA				NOTES
	CURRENT (Measured)	Stromberg-Carlson PART No.	RCA PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	
M1	.160A	162000-052 *	1N1763 *	40K *	SR500 *	* Silicon
M2	.160A	162000-052 *	1N1763 *	40K *	SR500 *	

MISCELLANEOUS

ITEM No.	PART NAME	Stromberg-Carlson PART No.	NOTES
M3	Switch	158000-126	Function (Rotary Wafer Type)
M4	Switch	158000-032	Mode (SPDT Slide Type)
M5	Switch	158000-055	Power Off-On (SPST Slide Type)
M6	Circuit Breaker	158000-134	

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA					NOTES
	PRI.	SEC. 1	SEC. 2	Stromberg-Carlson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	117V @ 1.1A	130V @ .6A AC	6.3V @ 2.2A	161000-210					
	SEC. 3	SEC. 4	SEC. 5						
	6.3V @ 2.2A								

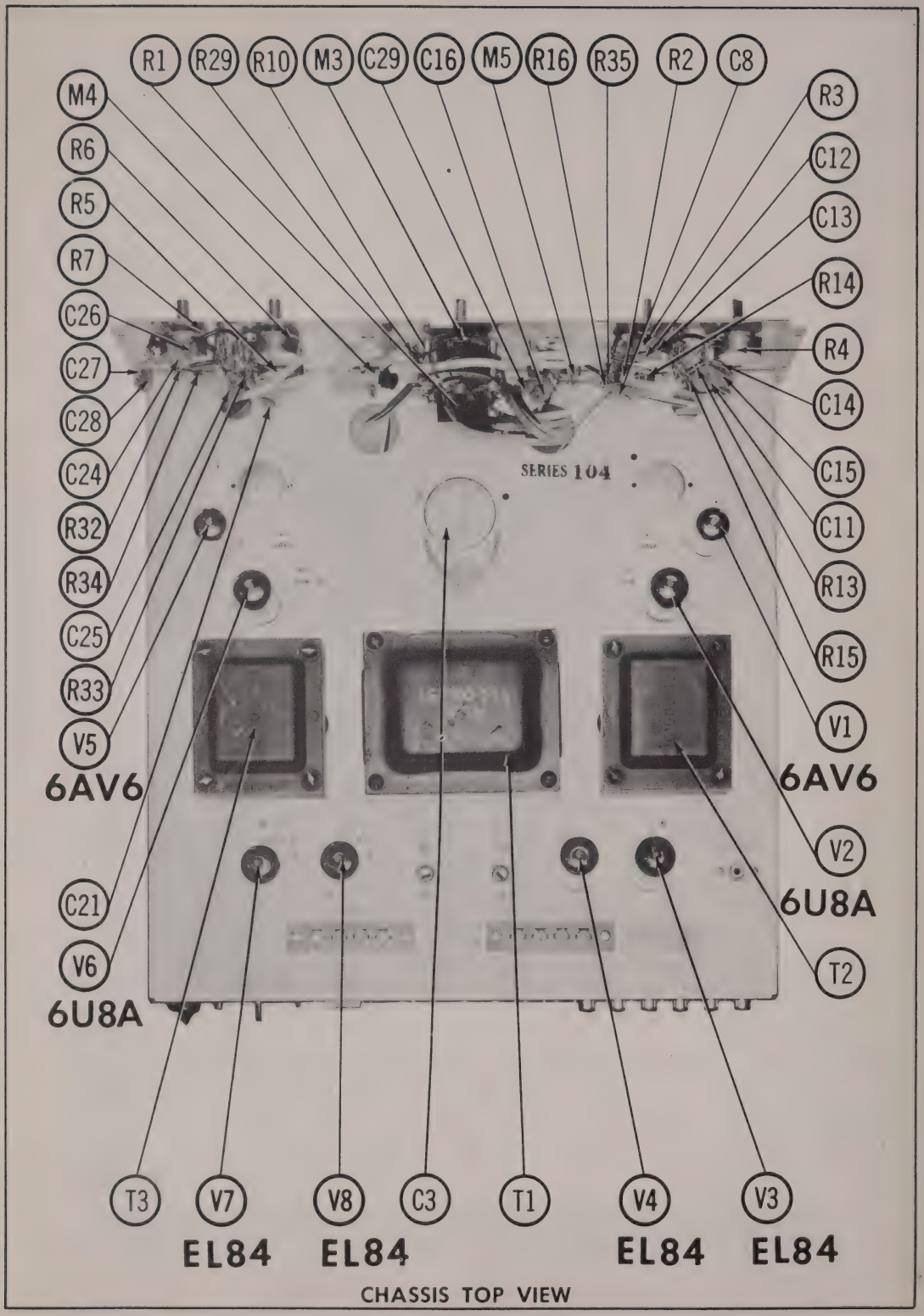
TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA					NOTES
	PRI.	SEC.	Stromberg-Carlson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	5700Ω CT	16Ω Taps @ 8Ω, 4Ω	161000-159			22S95 ①		① Use Original Shields
T3	5700Ω CT	16Ω Taps @ 8Ω, 4Ω	161000-159			22S95 ①		

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)



CHASSIS TOP VIEW

PHOTOFACT® Folder

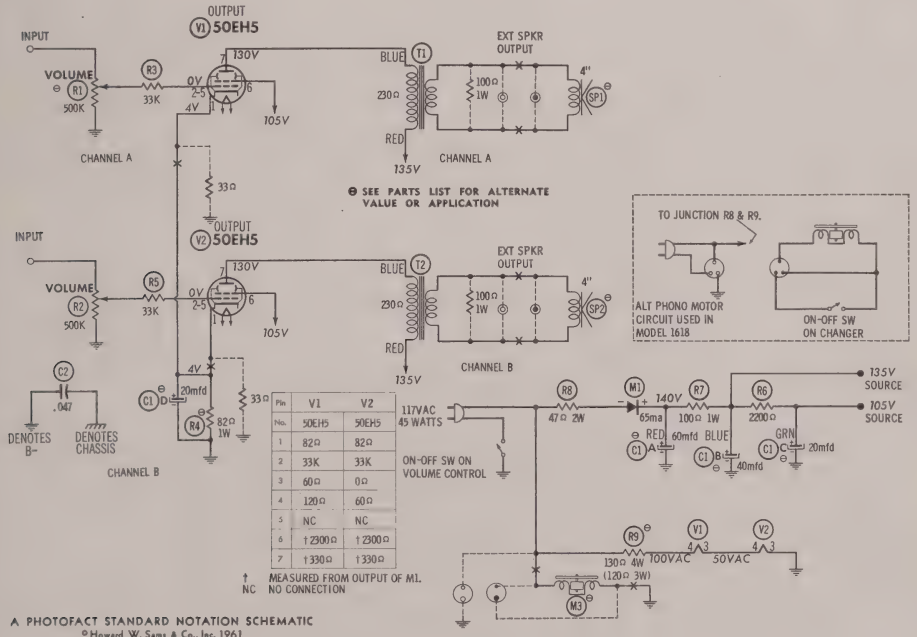
SYMPHONIC MODELS
508, 1604, 1607, 1618, 1695

SYMPHONIC MODELS
508, 1604, 1607, 1618, 1695

MODEL 1604

TRADE NAME	Symphonic Models 508, 1604, 1607, 1618, 1695
MANUFACTURER	Symphonic Radio & Electronic Corp., 235 Jersey Ave., New Brunswick, N. J.
TYPE SET	AC Operated 2 Tube Stereo Phono Amplifier With Record Player
POWER SUPPLY	110 - 120 Volts AC, 60 Cycles RATING 45 Watts, .51 Amp. @117 Volts AC (Less Motor)

MODELS 1604 AND 1695 HAVE 3 SPEED MANUAL RECORD PLAYERS.
MODELS 508 AND 1607 HAVE 4 SPEED MANUAL RECORD PLAYERS.
MODEL 1618 HAS 4 SPEED AUTOMATIC RECORD CHANGER — FOR SERVICE INFORMATION — SEE SIMILAR MONARCH UA8 — PHOTOFACT SET 381 FOLDER 11 OR RECORD CHANGER MANUAL RC-11



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SET 520 FOLDER 13

PARTS LIST AND DESCRIPTIONS

TUBES

• GENERAL ELECTRIC • RAYTHEON • SYLVANIA •					
ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V1	Channel A Output	50EH5	V2	Channel B Output	50EH5

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA SYMPHONIC PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	60	150	CE 138 ①	PR4-200	BBRT64215	TCT3119	TDLT-3	TVAS-4545 *	
B	40	150			BBR20-150	TC45	TD-60-150		
C	20	150							
D	20	150	①						

① CID is not used in Model 1695.
* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C2	.047 400V		P488N-047	DD-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA SYMPHONIC PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500K	½	VC-157 ①	B-60-S	A47-500K-Z	Q13-133	U48	Volume, Channel A
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
C	Switch			Not Req.	SWE-12	76-1	US-26	Power Off-On
R2A	500K	½	VC-208	B-60	A47-500K-Z	Q13-133	U48	Volume, Channel B
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	

① Models 508, 1607, 1618 use Part #VC-208 (See R2 for replacements).

RESISTORS (IRC or EQUIVALENT)

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R3	33K	
R4	82Ω 1W	Note 1
R5	33K	

ITEM No.	RATING	REMARKS
R6	2200Ω	
R7	100Ω 1W	
R8	47Ω 2W	

ITEM No.	RATING	REMARKS
R9	130Ω 4W	(120Ω 3W) * IRC#PW5-130Ω

* Used in Model 1604.
Note 1. Model 1695 uses one 33Ω resistor for each cathode.

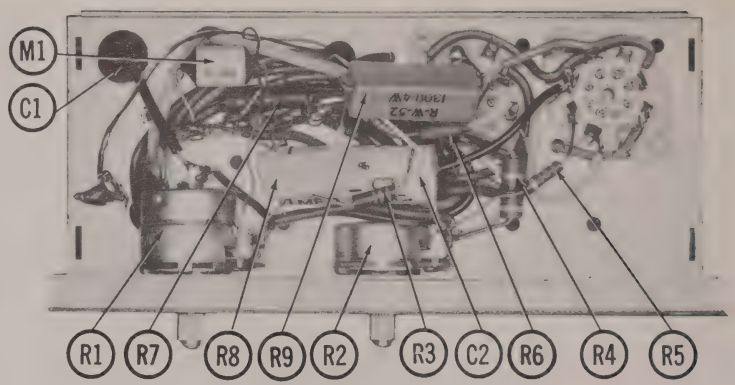
TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA SYMPHONIC PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	2600Ω	3-4Ω	TR-170	A-3025①	A-3332①	26S58	S-12X①	① Drill New Mounting Holes.
T2	2600Ω	3-4Ω	TR-170	A-3025①	A-3332①	26S58	S-12X①	

SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA SYMPHONIC PART No.	QUAM PART No.	NOTES
SP1	4"	PM	3-4Ω	SP-402 *	4A07Z4	* Used in Models 1604, 1695
SP2	4"	PM	3-4Ω	SP-402 *	4A07Z4	♦ Used in Models 1607, 508, 1618
	4"	PM	3-4Ω	SP-401♦	4A1	

CHASSIS—BOTTOM VIEW



POWER RECTIFIERS

ITEM No.	RATING CURRENT (Measured)	REPLACEMENT DATA SYMPHONIC PART No.	RCA PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	NOTES
M1	.065A	SR-107 *	1N1763 *	2F4 *	SR200 *	* Silicon Type

PHONO CARTRIDGE & NEEDLES

*NEEDLE LISTINGS SHOWN ARE FOR RESPECTIVE REPLACEMENT CARTRIDGES ONLY.

ITEM No.	REPLACEMENT DATA SYMPHONIC PART No. CARTRIDGE	SYMPHONIC PART No. NEEDLE*	ASTATIC PART No. CARTRIDGE	ASTATIC PART No. NEEDLE*	ELECTRO-VOICE PART No. CARTRIDGE	ELECTRO-VOICE PART No. NEEDLE*	SONOTONE PART No. CARTRIDGE	SONOTONE PART No. NEEDLE*	NOTES
M2			74TS	N8-7 * & N8-3 *	96T	Not Req.	12TH-S	Not Req.	Models 1604, 1695, 1607 & 508
			76-TS-TB	N8-7 * & N8-3 *	96T	Not Req.	12TH-S	Not Req.	Model 1618
			420-TS-TB	N8-1 * & N8-3 *	46T	Not Req.	12TH-S	Not Req.	May be used in Model 1618

MISCELLANEOUS

ITEM No.	PART NAME	SYMPHONIC PART No.	NOTES
M3	Motor	MO-109	3 Speed, Models 1695, 1604
	Motor	MO-111	4 Speed, Models 1607, 508 (Gray)
	Motor	MO-113	4 Speed, Models 1607, 508 (Tan)
	Idler Wheel		Waisco Part No. 1433

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No. 1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No. 8401
Phono Pick-up Arm Cable	Use BELDEN No. 8430 (Two Conductor - Twisted)

PHOTOFACT® Folder

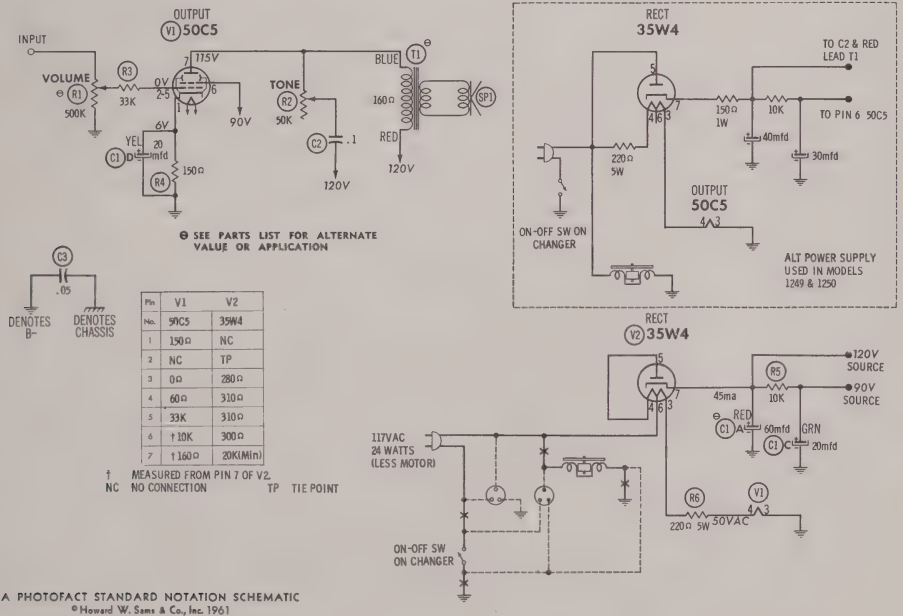
SYMPHONIC MODELS
1249, 1250, 1516, 1518, 1616

SYMPHONIC MODELS
1249, 1250, 1516, 1518, 1616

MODEL 1616

TRADE NAME	Symphonic Models 1249, 1250, 1516, 1518, 1616
MANUFACTURER	Symphonic Radio & Electronic Corp., 235 Jersey Ave., New Brunswick, N. J.
TYPE SET	AC Operated 2 Tube Phono Amplifier With 4 Speed Automatic Record Changer
POWER SUPPLY	110 - 120 Volts AC, 60 Cycles RATING 24 Watts, .24 Amp. ⓐ117 Volts AC (Less Motor)

FOR SERVICE INFORMATION ON RECORD CHANGER — SEE SIMILAR MONARCH UA8 — PHOTOFACT SET 381 FOLDER 11 OR RECORD CHANGER MANUAL RC-11



Pin	V1	V2
No.	50C5	35W4
1	150Ω	NC
2	NC	TP
3	0Ω	280Ω
4	60Ω	310Ω
5	33K	310Ω
6	†10K	300Ω
7	†160Ω	20K(Min)

† MEASURED FROM PIN 7 OF V2.
NC NO CONNECTION TP TIE POINT

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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SYMPHONIC MODELS
1249, 1250, 1516, 1518, 1616

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1961 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

KS202

SET 520 FOLDER 14

PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No.	GENERAL ELECTRIC • RAYTHEON • SYLVANIA • USE	TYPE
V1	Output	50C5

ITEM No.	USE	TYPE
V2	Rectifier	35W4

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA SYMPHONIC PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	60	150	CE130 ① ②	PR4-200	BBRT8425 BBR20-150	TCT3119 TC45	TDLT-3 TD-80-150	TVAS-4545 *	① ②
B	40	150							
C	20	150							
D	20	150							

① Some versions may use 60-40-20mfd in this application (Part #CE101).
② C1B is not used.
* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C2	.1 400V		P488N-1	DF-104	CUB4P1	4DP-3-104	GEM-401	4TM-P10
C3	.05 400V		P488N-05	DD-503	CUB4S5	4DP-3-503	GEM-415	4TM-S50

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA SYMPHONIC PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500K	½	VC-208	B-60	A47-500K-Z	Q13-133	U48	Volume, Note 1
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R1A	500K	½	VC-116	B-59	A47-500K-S	Q11-133	U50	Volume, Note 2
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R2A	50K	½	VC-156	B-31	A47-50K-S	Q11-123	U35	Tone
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	

Note 1. Used in Model 1616.
Note 2. Used in Models 1249, 1250, 1516, 1518.

RESISTORS (IRC or EQUIVALENT)

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R3	33K	
R4	150Ω	

ITEM No.	RATING	REMARKS
R5	10K	
R6	220Ω 5W	IRC#PW5-220Ω

ITEM No.	RATING	REMARKS

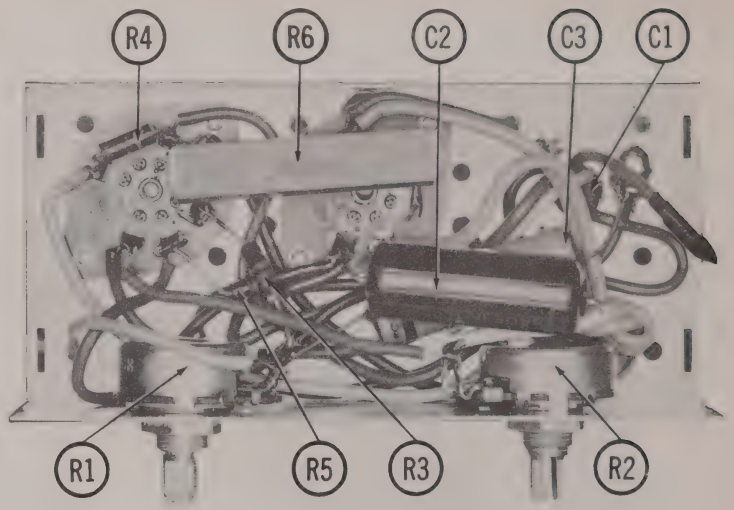
TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA SYMPHONIC PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	1900Ω	3-4Ω	TR-174 ①	A-3025	A-3332	26S58	S-12X	① Alternate Part #TR-109. Part #TR-118 used in Models 1518, 1249.

SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA SYMPHONIC PART No.	REPLACEMENT DATA QUAM PART No.	NOTES
SP1	4"	PM	3-4Ω	SP-401	4A1	

CHASSIS—BOTTOM VIEW



PHONO CARTRIDGE & NEEDLES

*NEEDLE LISTINGS SHOWN ARE FOR RESPECTIVE REPLACEMENT CARTRIDGES ONLY.

ITEM No.	SYMPHONIC PART No. CARTRIDGE	SYMPHONIC PART No. NEEDLE*	ASTATIC PART No. CARTRIDGE	ASTATIC PART No. NEEDLE*	ELECTRO-VOICE PART No. CARTRIDGE	ELECTRO-VOICE PART No. NEEDLE*	SONOTONE PART No. CARTRIDGE	SONOTONE PART No. NEEDLE*	NOTES
M1		*	420-TS-TB	N8-1 * & N8-3 *					

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	KN182	Volume, Tone Mahogany, Models 1249, 1250, 1516
Knob	KN179	Tone, Grey, Models 1250, 1516
Knob	KN180	Volume, Grey, Models 1250, 1516
Knob	KN181	Tone, Mahogany, Models 1250, 1516
Knob	KN304	Tone, Volume, Clear With Nickel Insert, Model 1518
Knob	KN392	Tone, Volume, White, Model 1616

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No. 1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No. 8401
Phono Pick-up Arm Cable	Use BELDEN No. 8430 (Two Conductor - Twisted)

PHOTOFACT® Folder

TRUETONE MODELS 4DC5941A, 4DC5943A, 4DC5945A

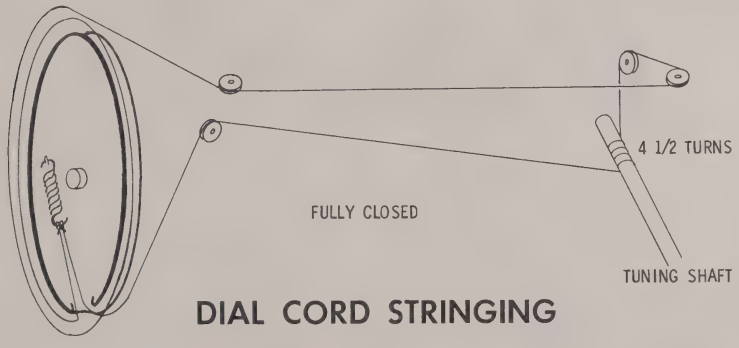
TRUETONE MODELS
4DC5941A, 4DC5943A, 4DC5945A

MODEL 4DC5945A

TRUETONE MODELS
4DC5941A, 4DC5943A, 4DC5945A

TRADE NAME	Truetone Models 4DC5941A, 4DC5943A, 4DC5945A		
SUPPLIER	Western Auto Supply Co., 2107 Grand Ave., Kansas City 8, Mo.		
TYPE SET	AC Operated 9 Tube FM-AM Tuner, 2 Tube Stereo Preamplifier, 8 Tube Stereo Amplifier And 4 Speed Automatic Record Changer		
POWER SUPPLY	105 - 125 Volts AC, 60 Cycles	RATING	170 Watts, 1.6 Amp. @117 Volts AC (Less Motor)
TUNING RANGE—BROADCAST	535 - 1620KC	FREQ. MOD.	88 - 108MC

FOR SERVICE INFORMATION ON RECORD CHANGER PART #28A232 — SEE V-M 1200A — PHOTOFACT SET 353 FOLDER 16 OR RECORD CHANGER MANUAL RC-10



DIAL CORD STRINGING

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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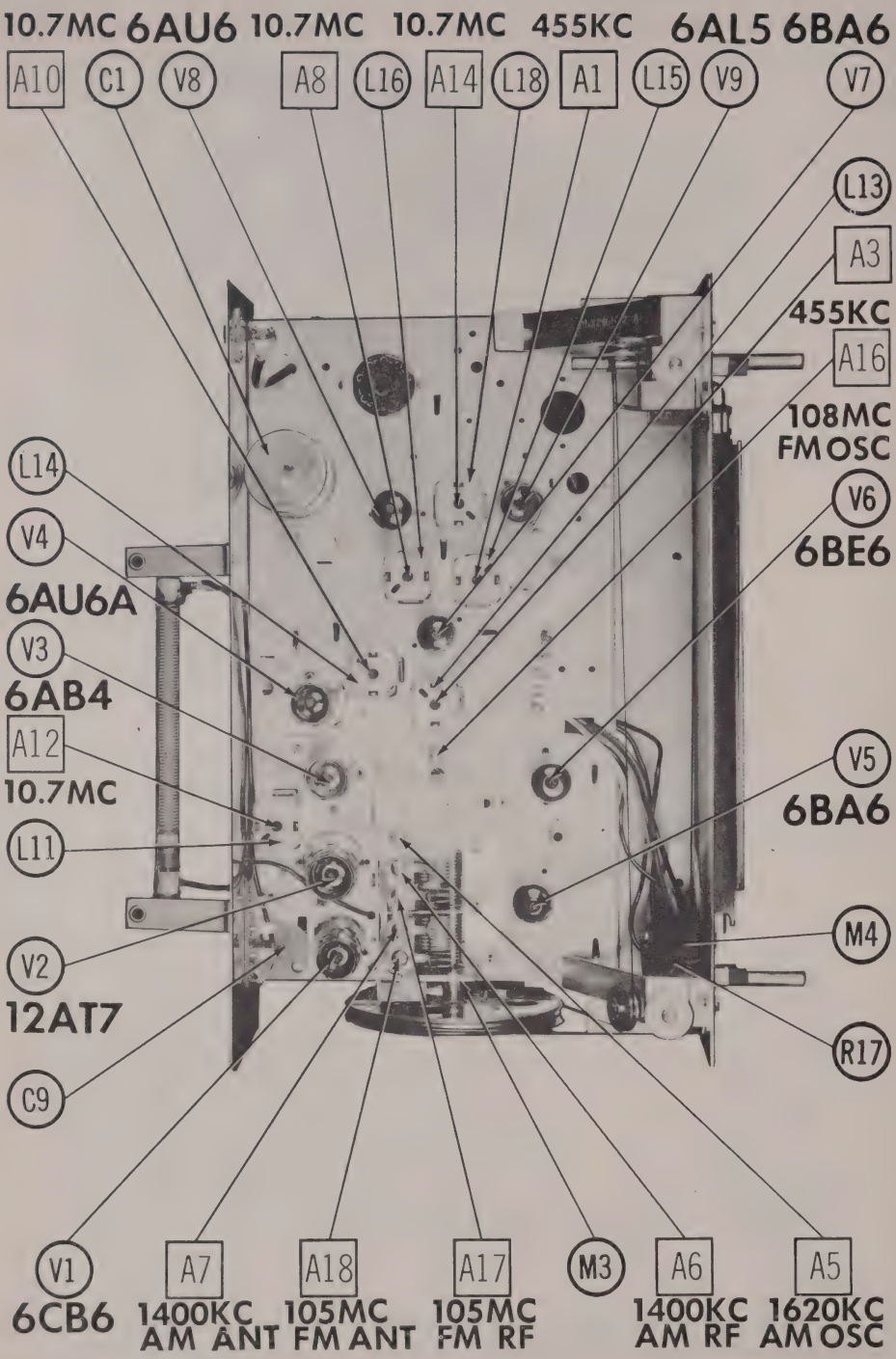
JN409R

DATE 2-61 SET 520 FOLDER 15

SET 520 FOLDER 15



TUNER CHASSIS — TOP VIEW

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.
Suggested alignment tools: A1 thru A4 and A8 thru A15..... GENERAL CEMENT #5004, 5008, 5009
WALSCO #2520
A5, A6, A7, A16, A17, A18..... GENERAL CEMENT #5097, 8727
WALSCO #2515

AM ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1mfd	High side to pin 7 (grid) of AM Converter. Low side to chassis.	455KC (400∿ Mod.)	AM	Tuning gang fully open	Across output jack	A1, A2, A3, A4	Adjust for maximum output.
2.	"	"	1620KC	"	"	"	A5	"
3.	"	High side to pin 1 (grid) of AM RF Amp. Low side to chassis.	1400KC	"	1400KC	"	A6	"
4.	100mmf Ceramic Capacitor	High side to AM antenna terminal. Low side to chassis.	1400KC	"	1400KC	"	A7	"

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
5.	.005mfd	High side to pin 2 (grid) of FM Mixer. Low side to chassis.	10.7MC (Unmod.)	FM	Tuning gang fully open	DC probe to point (A). Common to chassis.	A8, A9, A10, A11, A12, A13	Adjust for maximum deflection.
6.	"	High side to pin 1 (grid) of FM Limiter. Low side to chassis.	"	"	"	DC probe to point (B). Common to chassis.	A14	"
7.	"	"	"	"	"	DC probe to point (C). Common to chassis.	A15	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
5.	.005mfd	High side to pin 2 (grid) of FM Mixer. Low side to chassis.	10.7MC (450KC Swp)	FM	Tuning gang fully open	Vert. amp. thru 100K to point (A). Low side to chassis.	A8, A9, A10, A11, A12, A13	Adjust for maximum gain and symmetry of response similar to Fig. 1 with markers as shown.
6.	"	High side to pin 1 (grid) of FM Limiter. Low side to chassis.	"	"	"	Vert. amp. thru 100K to point (B). Low side to chassis.	A14	"
7.	"	"	"	"	"	Vert. amp. thru 100K to point (C). Low side to chassis.	A15	Adjust to place marker at the center of crossover lines similar to Fig. 2. SLIGHTLY retouch A14 for maximum amplitude and straightness of crossover lines.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
8.	Two 150Ω Carbon Resistor	Across FM antenna terminals with 150Ω in each lead.	108MC (Unmod.)	FM	108MC	DC probe to point (A). Common to chassis.	A16	Adjust for maximum deflection.
9.	"	"	105MC	"	105MC	"	A17, A18	Adjust for maximum deflection while rocking tuning gang.

FIG. 1

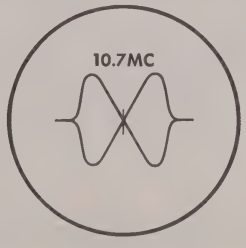
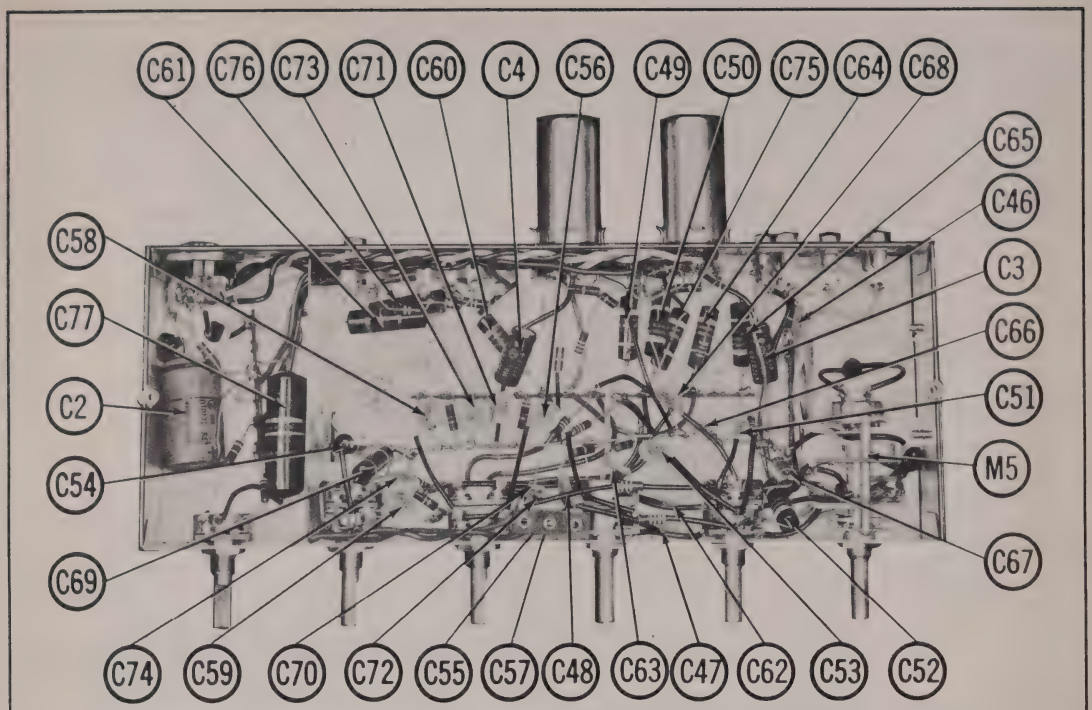
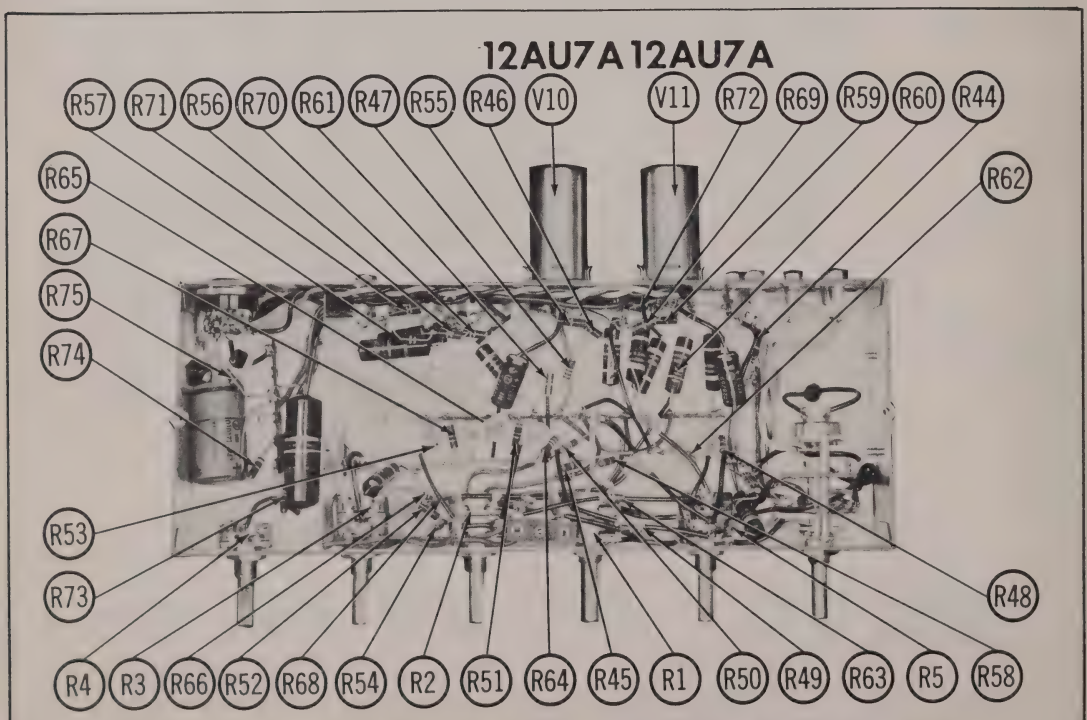


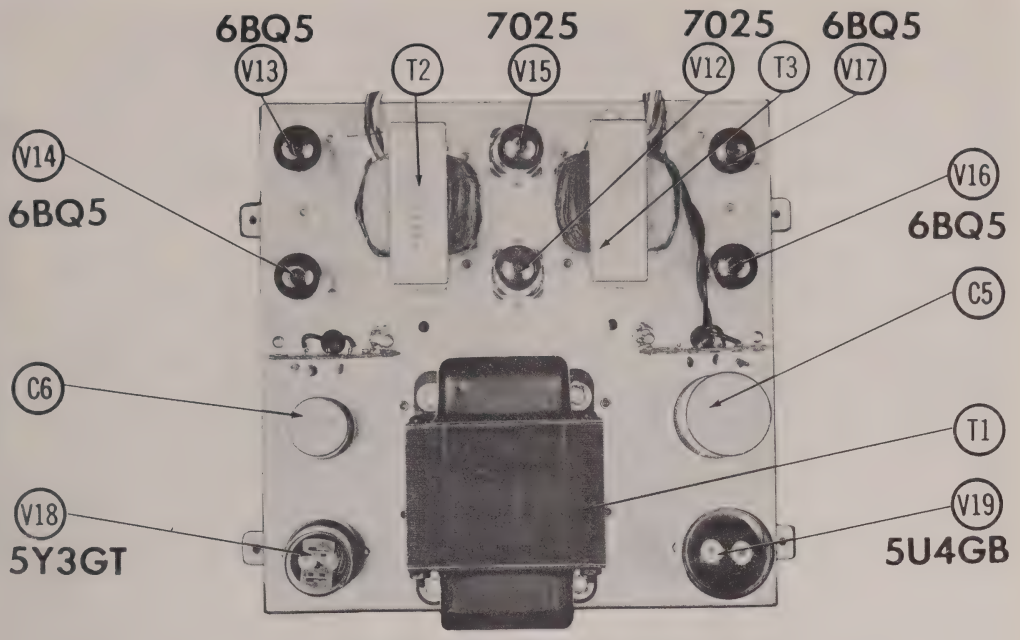
FIG. 2



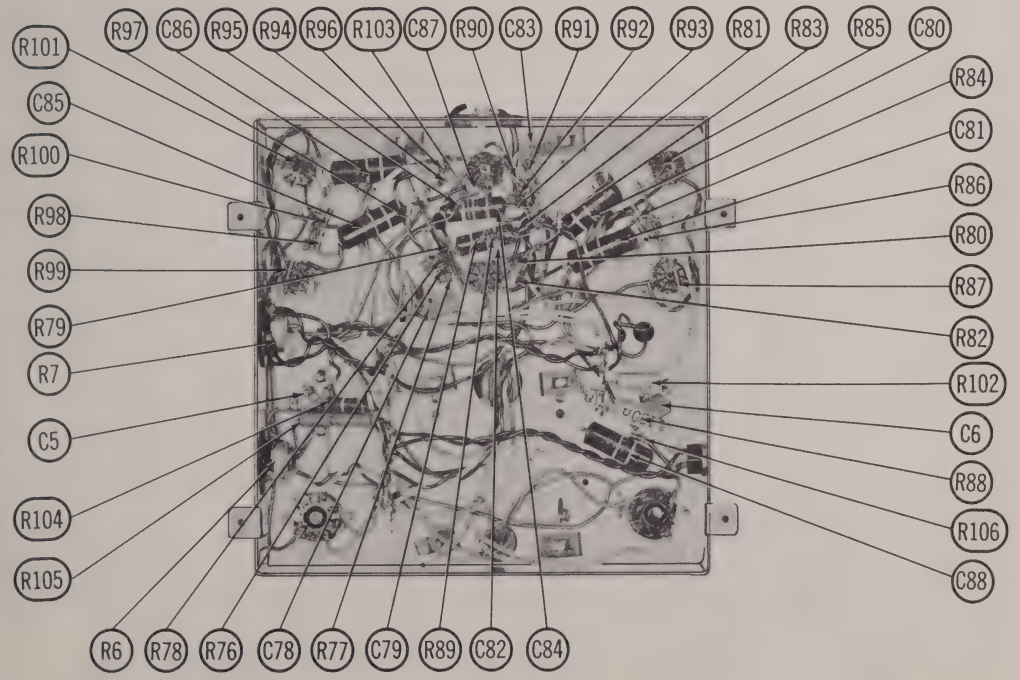
PREAMP. CHASSIS BOTTOM VIEW – CAPACITOR & MISC. IDENT.



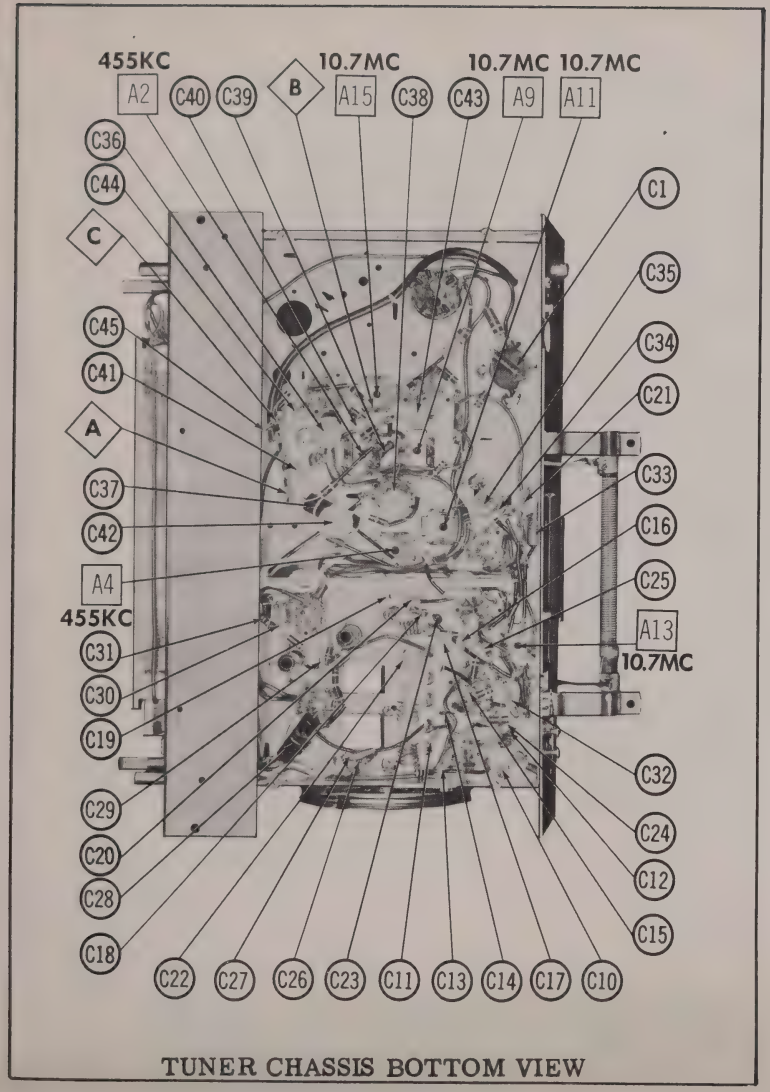
PREAMP. CHASSIS BOTTOM VIEW – RESISTOR & TUBE IDENT.



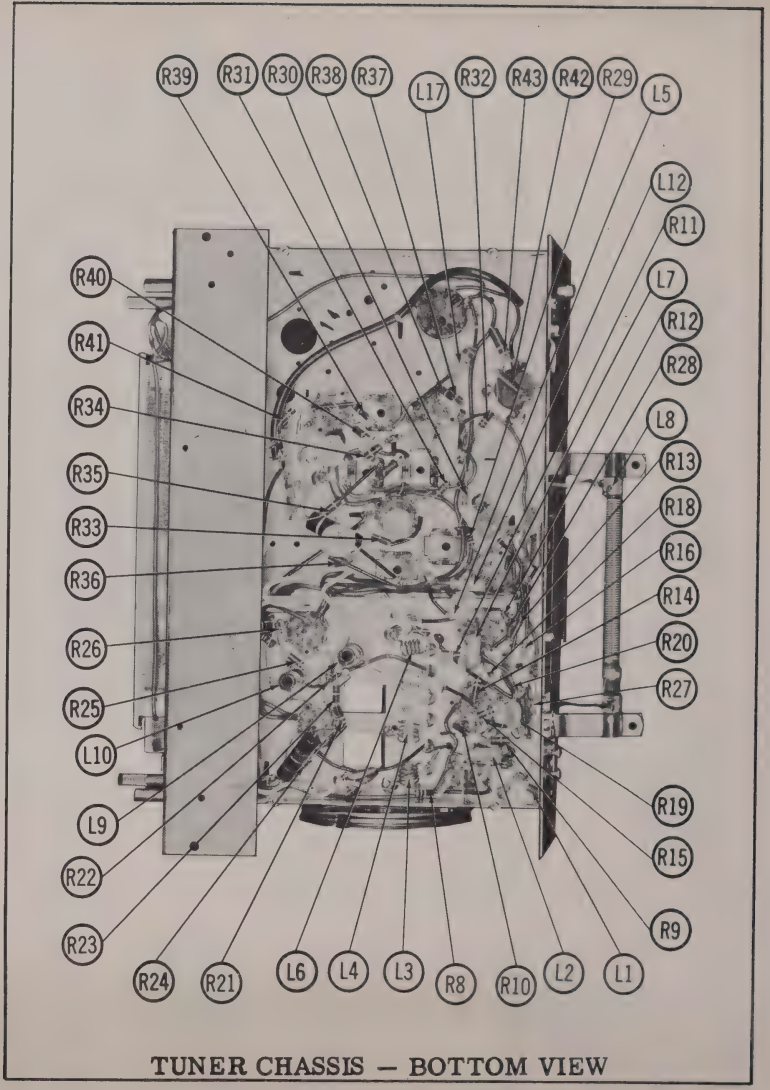
AMP CHASSIS — TOP VIEW



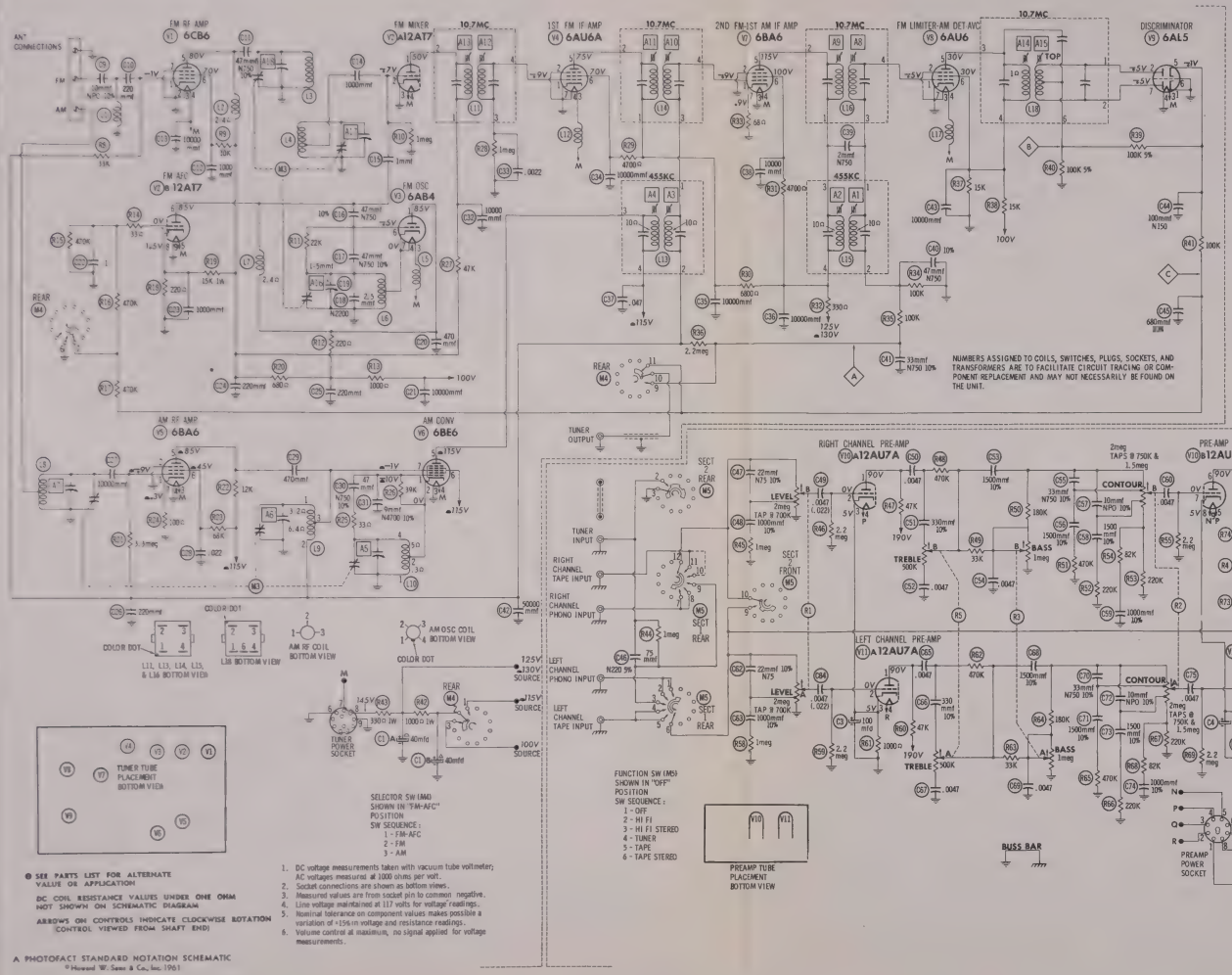
AMP CHASSIS — BOTTOM VIEW



TUNER CHASSIS BOTTOM VIEW



TUNER CHASSIS — BOTTOM VIEW


FM RF AMP V1 6CB6
FM MIXER V2 12AT7
1ST FM IF AMP V4 6AU6A
2ND FM-1ST AM IF AMP V7 6BA6
FM LIMITER-AM DET-AVC V8 6AU6
DISCRIMINATOR V9 6AL5
FM AFC V6 12AT7
FM OSC V3 6AB4
AM RF AMP V5 6BA6
AM CONV V6 6BE6
10.7MC
455KC
TUNER OUTPUT
RIGHT CHANNEL PRE-AMP V10A 12AU7A
PRE-AMP V10B 12AU7A
LEFT CHANNEL PRE-AMP V11A 12AU7A
PRE-AMP V11B 12AU7A
TAPE OUTPUT
BUSS BAR
PREAMP TUBE PLACEMENT BOTTOM VIEW
PREAMP POWER SOCKET
TUNER POWER SOCKET
TUNER TUBE PLACEMENT BOTTOM VIEW
AM OSC COIL BOTTOM VIEW
AM RF COIL BOTTOM VIEW
L11, L13, L14, L15, & L16 BOTTOM VIEW
L16 BOTTOM VIEW
NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.
SELECTOR SW (M4) SHOWN IN "FM-AFC" POSITION
SW SEQUENCE:
1 - FM-AFC
2 - FM
3 - AM
FUNCTION SW (M5) SHOWN IN "OFF" POSITION
SW SEQUENCE:
1 - OFF
2 - HI FI
3 - HI FI STEREO
4 - TUNER
5 - TAPE
6 - TAPE STEREO
SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)
1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±5% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.
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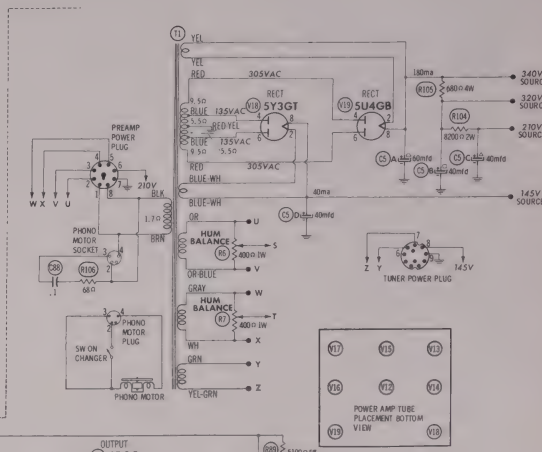
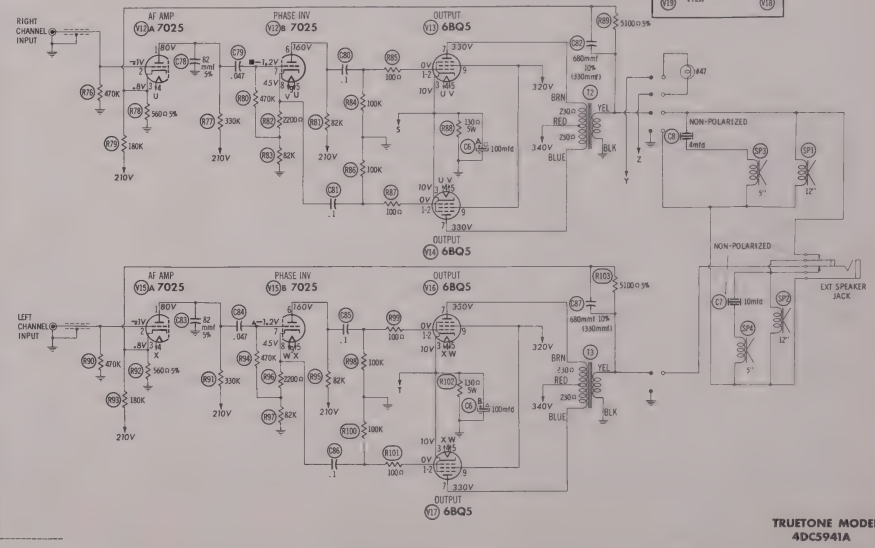
RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6CB6	2.4meg	0Ω	0Ω	.1Ω	↑8000Ω	↑13K	0Ω		
V2	12AT7	↑50K	1meg	0Ω	.1Ω	.1Ω	↑2500Ω	↑700K 400K	220Ω	0Ω
V3	6AB4	↑2500Ω	NC	.7Ω	0Ω	TP	22K	0Ω		
V4	6AU6A	1meg	0Ω	.5Ω	0Ω	↑7500Ω	↑11K	0Ω		
V5	6BA6	▲5.7meg	▲0Ω	.1Ω	0Ω	↑▲13K	↑▲69K	▲100Ω		
V6	6BE6	▲39K	▲3Ω	0Ω	.1Ω	↑▲1300Ω	↑▲1300Ω	▲2.4meg		
V7	6BA6	2.4meg	0Ω	0Ω	.1Ω	↑660Ω	↑5300Ω	68Ω		
V8	6AU6	100K	0Ω	0Ω	.1Ω	↑12K	↑12K	0Ω		
V9	6AL5	0Ω	100K	.1Ω	0Ω	150K	0Ω	100K		
V10	12AU7A	↑↑57K	2.2meg	1000Ω	230Ω	230Ω	↑↑45K	2.2meg	1000Ω	230Ω
V11	12AU7A	↑↑57K	2.2meg	1000Ω	230Ω	230Ω	↑↑45K	2.2meg	1000Ω	230Ω
V12	7025	↑↑340K	470K	560Ω	230Ω	230Ω	↑↑90K	550K	84K	230Ω
V13	6BQ5	100K	100K	130Ω	230Ω	230Ω	NC	↑↑230Ω	NC	↑↑680Ω
V14	6BQ5	100K	100K	130Ω	230Ω	230Ω	NC	↑↑230Ω	NC	↑↑680Ω
V15	7025	↑↑340K	470K	560Ω	230Ω	230Ω	↑↑90K	550K	84K	230K
V16	6BQ5	100K	100K	130Ω	230Ω	230Ω	NC	↑↑230Ω	NC	↑↑680Ω
V17	6BQ5	100K	100K	130Ω	230Ω	230Ω	NC	↑↑230Ω	NC	↑↑680Ω
V18	5Y3GT	NC	¶	NC	5.5Ω	NC	5.5Ω	NC	¶	
V19	5U4GB	NC	¶	NC	150	NC	150	NC	¶	

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT. ALL MEASUREMENTS TAKEN IN "FM" POSITION UNLESS OTHERWISE DESIGNATED.
† MEASURED FROM PIN 8 OF V16.
†† MEASURED FROM PIN 8 OF V19.
■ MEASURED FROM PIN 8 OF V12.
▲ MEASURED FROM PIN 8 OF V15.
NC NO CONNECTION
* MEASURED IN "FM-AFC" POSITION.
^ MEASURED IN "AM" POSITION.





TRUETONE MODEL 4DC5941A

PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V1	FM RF Amplifier	6CB6	V11	Left Channel Preamp.	12AU7A (ECC82)
V2	FM Mixer-AFC	12AT7	V12	Right Channel AF Amp. - Right Channel Phase Inv.	7025
V3	FM Osc.	6AB4			
V4	1st FM IF Amp.	6AU6A	V13	Right Channel Output	6BQ5 (EL84)
V5	AM RF Amplifier	6BA6	V14	Right Channel Output	6BQ5 (EL84)
V6	AM Converter	6BE6	V15	Left Channel AF Amp. - Left Channel Phase Inv.	7025
V7	2nd FM IF Amp. - 1st AM IF Amp.	6BA6			
			V16	Left Channel Output	6BQ5 (EL84)
V8	FM Limiter - AM Det. - AVC	6AU6	V17	Left Channel Output	6BQ5 (EL84)
			V18	Rectifier	5Y3GT
V9	Discriminator	6AL5	V19	Rectifier	5U4GB
V10	Right Channel Preamp.	12AU7A (ECC82)			

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA TRUETONE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	▲40	200	45X454	AFH2-57	B0450	FP2i7.87	TMD-31	TVL-2575	
B	▲40	200							
C2	20	350	45X455	PRS450V20	BR2035	TC65	TD-20-350	TVA-1608	
C3	100	10	45X459	SRE12V100	NLW100-10	TT15X100	ML100-15	TE-1119.3	
C4	100	10	45X459	SRE12V100	NLW100-10	TT15X100	ML100-15	TE-1119.3	
C5A	▲60	400	45X450		C0350	FP377		TVLS-4671l.1*	
B	■40	400			BR8045	TC795			
C	▲40	400							
D	40	200							
C6A	■100	25	45X457	AFH2-06-20	B0085	WP202.5	TMD-107	TVL-2326	
B	▲100	25							
C7	10	50NP	45X461	NP-PRS360VNP10	BBR20-150 †	TCN5010		TVAS-1304.1*	Note 1
C8	4	50NP	45X458	NP-PRS50VNP4	BBR8-150 †	TCN504		TVAS-1302.5*	Note 1

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

† Use 2 units. Connect negatuve terminals together. Connect positive terminals into circuit the same as the original non-polarized unit. Note 1. Alternate Value 5mfd (Part #45X426)

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C9	10 NPO 10%		NPO-DI 10	DTZ-10	C10Q1C	CCTO-100	CNO-410	10TCC-Q10
C10	220		BPD-00022	DD-221	L10T22	CCD-221	B-322	5GA-T22
C11	47 N750 10%		N750-DI 47	DTN-47	C10Q47U	CCTN-470	CN7-447	10TCU-Q47
C12	1000		BPD-001	DD-102	BYA10D1M	CCD-102	B-210	5HK-D10

FIXED CAPACITORS (cont)

ITEM No.	RATING	REMARKS	REPLACEMENT DATA AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C13	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C14	1000		BPD-001	DD-102	BYA10D1M	CCD-102	B-210	5HK-D10
C15	1		NPO-SI 1.0	TCZ-1	C10V15C		CNO-510	10TCC-V10
C16	47 N750 10%		N750-DI 47	DTN-47	C10Q47U	CCTN-470	CN7-447	10TCU-Q47
C17	47 N750 10%		N750-DI 47	DTN-47	C10Q47U	CCTN-470	CN7-447	10TCU-Q47
C18	2.5 N2200	#47X635						
C19	1-5	#17A274		829-6				
C20	470		BPD-00047	DD-471	BYA10T47	CCD-471	B-347	5GA-T47
C21	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C22	.1 100V		P288N-1	DF-104	CUB2P1	1DP-2-104	GEM-201	2TM-P1
C23	1000		BPD-001	DD-102	BYA10D1M	CCD-102	B-210	5HK-D10
C24	220		BPD-00022	DD-221	L10T22	CCD-221	B-322	5GA-T22
C25	220		BPD-00022	DD-221	L10T22	CCD-221	B-322	5GA-T22
C26	220		BPD-00022	DD-221	L10T22	CCD-221	B-322	5GA-T22
C27	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C28	.022 200V		P288N-022		CUB4S22	4DP-2-223	GEM-4122	4TM-S22
C29	470		BPD-00047	DD-471	BYA10T47	CCD-471	B-347	5GA-T47
C30	47 N750 10%		N750-DI 47	DTN-47	C10Q47U	CCTN-470	CN7-447	10TCU-Q47
C31	9 N4700 10%	#47X632						
C32	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C33	.0022 200V		P288N-0022	D6-222	CUB6D22	6DP-1-222	GEM-6222	6TM-D22
C34	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C35	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C36	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C37	.047 400V		P488N-047	DF-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C38	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C39	2 N750	#47X628						
C40	47 N750 10%		N750-DI 47	DTN-47	C10Q47U	CCTN-470	CCN-447	10TCU-047
C41	33 N750 10%		N750-DI 33	DTN-33	C10Q33U	CCTN-330	CN7-433	10TCU-Q47
C42	50000		BPD-05	DF-503	CUB2S5	6DP-3-503	TA-150	5HK-S50
C43	10000		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C44	100 N150							
C45	680 10%		DI-680	D6-681	1R5T68	CCD-681	JL-368	MS-368
C46	75 N220 5%							
C47	22 N75 10%	#80X32						
C48	1000 10%		DI-1000		1R5D1	CCS-102	JL-210	MS-21
C49	.0047 400V	(.022) †	P488N-0047	D6-472	CUB6D47	6DP-1-472	GEM-6247	6TM-D47
C50	.0047 400V		P488N-0047	D6-472	CUB6D47	6DP-1-472	GEM-6247	6TM-D47
C51	330 10%		DI-330	D6-331	L10T33	CCD-331	JL-333	MS-333
C52	.0047 400V		P488N-0047	D6-472	CUB6D47	6DP-1-472	GEM-6247	6TM-D47
C53	1500 10%		DI-1500		1R5D15	CCS-152	JL-215	MS-215
C54	.0047 400V		P488N-0047	D6-472	CUB6D47	6DP-1-472	GEM-6247	6TM-D47
C55	33 N750 10%		N750-DI 33	DTN-33	C10Q33U	CCTN-330	CN7-433	10TCU-Q33
C56	1500 10%		DI-1500		1R5D15	CCS-152	JL-215	MS-215
C57	10 NPO 10%		NPO-DI 10	DTZ-10	C10Q1C	CCTO-100	CNO-410	10TCC-Q10
C58	1500 10%		DI-1500		1R5D15	CCS-152	JL-215	MS-215
C59	1000 10%		DI-1000		1R5D1	CCS-102	JL-210	MS-21
C60	.0047 400V		P488N-0047	D6-472	CUB6D47	6DP-1-472	GEM-6247	6TM-D47

PARTS LIST AND DESCRIPTIONS (Continued)

FIXED CAPACITORS (cont)

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C61	.022 400V	(.0047) †	P488N-022		CUB4S22	4DP-2-223	GEM-4122	4TM-S22
C62	22 N75 10%	#80X32						
C63	1000 10%		DI-1000		1R5D1	CCS-102	JL-210	MS-21
C64	.0047 400V	(.022) †	P488N-0047	D6-472	CUB6D47	6DP-1-472	GEM-6247	6TM-D47
C65	.0047 400V		P488N-0047	D6-472	CUB6D47	6DP-1-472	GEM-6247	6TM-D47
C66	330 10%		DI-330	D6-331	L10T33	CCD-331	JL-333	MS-333
C67	.0047 400V		P488N-0047	D6-472	CUB6D47	6DP-1-472	GEM-6247	6TM-D47
C68	1500 10%		DI-1500		1R5D15	CCS-152	JL-215	MS-215
C69	.0047 400V		P488N-0047	D6-472	CUB6D47	6DP-1-472	GEM-6247	6TM-D47
C70	33 N750 10%		N750-DI 33	DTN-33	C10Q33U	CCTN-330	CN7-433	10TCU-Q33
C71	1500 10%		DI-1500		1R5D15	CCS-152	JL-215	MS-215
C72	10 NPO 10%		NPO-DI 10	DTZ-10	C10Q1C	CCTO-100	CNO-410	10TCC-Q10
C73	1500 10%		DI-1500		1R5D15	CCS-152	JL-215	MS-215
C74	1000 10%		DI-1000		1R5D1	CCS-102	JL-210	MS-21
C75	.0047 400V		P488N-0047	D6-472	CUB6D47	6DP-1-472	GEM-6247	6TM-D47
C76	.022 400V	(.0047) †	P488N-022		CUB4S22	4DP-2-223	GEM-4122	4TM-S22
C77	.47 200V		P288N-47		CUB2P47	2DP-5-474	GEM-2047	2TM-P47
C78	82 5%		1469-000082	TCZ-82	22R5Q82	CM-20B-820J	CNO-482	MS-482
C79	.047 400V		P488N-047	DF-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C80	.1 400V		P488N-1	DF-104	CUB4P1	4DP-3-104	GEM-401	4TM-P1
C81	.1 400V		P488N-1	DF-104	CUB4P1	4DP-3-104	GEM-401	4TM-P1
C82	680 10%	(330mmf) †	DI-680	D6-681	1R5T68	CCS-681	JL-368	MS-368
C83	82 5%		1469-000082	TCZ-82	22R5Q82	CM-20B-820J	CNO-482	MS-482
C84	.047 400V		P488N-047	DF-503	CUB4S47	4DP-3-473	GEM-4147	4TM-S47
C85	.1 400V		P488N-1	DF-104	CUB4P1	4DP-3-104	GEM-401	4TM-P1
C86	.1 400V		P488N-1	DF-104	CUB4P1	4DP-3-104	GEM-401	4TM-P1
C87	680 10%	(330mmf) †	DI-680	D6-681	1R5T68	CCS-681	JL-368	MS-368
C88	.1 400V		P488N-1	DF-104	CUB4P1	4DP-3-104	GEM-401	4TM-P1

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.
\# Truetone Part Number
† Alternate Value.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	TRUETONE PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	2meg *	½	36X411				▲ UE4042	Level, Left Channel
B	2meg *	½						Level, Right Channel
R2A	2meg †	½	36X408				‡ UE4035	Contour, Left Channel
B	2meg †	½						Contour, Right Channel
R3A	1meg	½	40X458	B-70	AD47-1meg-Z		■ UE3913	Bass, Left Channel
B	1meg	½		SR-70	Not Req.			Bass, Right Channel
C	Shaft			Not Req.	FS-3			
R4A	100K	½	40X459	B-40	A47-100K-S		U41	Balance
B	Shaft			Not Req.	FS-3		Not Req.	
R5A	500K	½	40X457	B-60	AD47-500K-Z		▲ UE1398	Treble, Left Channel
B	500K	½		SR-60	Not Req.			Treble, Right Channel
C	Shaft			Not Req.	FS-3			
R6A	400Ω	1(WW)	40X452	WN-401	A43-400	W11-202	R500L	Hum Balance Left Chann
B	Shaft			Not Req.	FKS-1/4	SK-5	Not Req.	
R7A	400Ω	1(WW)	40X452	WN-401	A43-400	W11-202	R500L	Hum Banance, Right Chann
B	Shaft			Not Req.	FKS-1/4	SK-5	Not Req.	

* Tap @ 700K
† Taps @ 750K & 1.5meg
‡ "STA-LOC" equivalent FA26DT155, RU26DT155, CS3500
▲ "STA-LOC" equivalent: FB26T75, RU26T75, CS3500
■ "STA-LOC" equivalent: FA16A, RU16A, CS-3500
▲ "STA-LOC" equivalent: FA55A, RU55A, CS-3500

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R8	33K	
R9	10K	
R10	1meg	
R11	22K	
R12	220Ω	
R13	1000Ω	
R14	33Ω	
R15	470K	
R16	470K	
R17	470K	
R18	220Ω	
R19	15K 1W	
R20	680Ω	
R21	3.3meg	
R22	12K	
R23	68K	
R24	100Ω	
R25	33Ω	
R26	39K	
R27	47K	
R28	1meg	
R29	4700Ω	
R30	6800Ω	
R31	4700Ω	
R32	330Ω	
R33	68Ω	
R34	100K	
R35	100K	
R36	2.2meg	
R37	15K	
R38	15K	
R39	100K 5%	
R40	100K 5%	

ITEM No.	RATING	REMARKS
R41	100K	
R42	1000Ω 1W	
R43	330Ω 1W	
R44	1meg	
R45	1meg	
R46	2.2meg	
R47	47K	
R48	470K	
R49	33K	
R50	180K	
R51	470K	
R52	220K	
R53	220K	
R54	82K	
R55	2.2meg	
R56	22K	
R57	22K	
R58	1meg	
R59	2.2meg	
R60	47K	
R61	1000Ω	
R62	470K	
R63	33K	
R64	180K	
R65	470K	
R66	220K	
R67	220K	
R68	82K	
R69	2.2meg	
R70	22K	
R71	22K	
R72	1000Ω	
R73	3300Ω	

ITEM No.	RATING	REMARKS
R74	3300Ω	
R75	2700Ω	
R76	470K	
R77	330K	
R78	560Ω 5%	
R79	180K	
R80	470K	
R81	82K	
R82	2200Ω	
R83	82K	
R84	100K	
R85	100Ω	
R86	100K	
R87	100Ω	IRC #PW5-130
R88	130Ω 5W	WORKMAN TV
R89	5100Ω 5%	#5W-SQ-130
R90	470K	
R91	330K	
R92	560Ω 5%	
R93	180K	
R94	470K	
R95	82K	
R96	2200Ω	
R97	82K	
R98	100K	
R99	100Ω	
R100	100K	
R101	100Ω	IRC #PW5-130
R102	130Ω 5W	WORKMAN TV
R103	5100Ω 5%	#5W-SQ-130
R104	8200Ω 2W	IRC #PW5-680
R105	680Ω 4W	WORKMAN TV
R106	68Ω	#5W-SQ-680

\# Truetone Part Number

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA				NOTES
		TRUETONE PART No.	Merit PART No.	Miller PART No.	Stancor PART No.	
L1	FM Ant (.9uh)	9A2448	BC-561	4602	RTC-8515	
L2	RF Choke (3.3uh)	35A8	BC-564	9320-18	RTC-8518	① ① IRC Part #CLA
L3	FM RF	9A2445				
L4	FM Mixer	9A2446				
L5	Fil. Choke (1.5uh)	35A6	BC-562	4604	RTC-8516	①
L6	FM Osc.	9A2447				
L7	RF Choke (3.3uh)	35A8	BC-564	9320-18	RTC-8518	①
L8	Loopstick	9A2441				
L9	AM RF	9A2439				
L10	AM Osc	9A2438				
L11	1st FM IF	9A2440	FM-254	1463	RTC-8599	
L12	Fil. Choke (1.5uh)	35A6	BC-562	4604	RTC-8516	①
L13	1st AM IF	9A2443	BC-352	12-C1	RTC-8632	
L14	2nd FM IF	9A2440	FM-254	1463	RTC-8599	
L15	2nd AM IF	9A2443	BC-353	12-C2	RTC-8633	
L16	3rd FM IF	9A2440	FM-254	1463	RTC-8599	
L17	Fil. Choke(1.5uh)	35A6	BC-562	4604	RTC-8516	①
L18	Discriminator	(9A2442	FM-253	1464	RTC-8665	

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA					NOTES
	PRI.	SEC. 1	SEC. 2	TRUETONE PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	117V Ⓐ 1.6A	610 VCT @ .180A Tap Ⓐ 270 VCT Ⓐ .040A	5V Ⓐ 3A	53X378					
	SEC. 3	SEC. 4	SEC. 5						
	5V Ⓐ 2A	6.3V Ⓐ 2.6A	6.3V Ⓐ 2.1A						
	SEC. 6								
	6.3V Ⓐ 2.1A								

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	TRUETONE PART No.	QUAM PART No.	
SP1	12"	PM	6-8Ω	12A561		
SP2	5"	PM	6-8Ω	12A563		
SP3	12"	PM	6-8Ω	12A562		
SP4	5"	PM	6-8Ω	12A563		

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA					NOTES
	PRI.	SEC.	TRUETONE PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	6200Ω CT	6-8Ω	51X201	A-3028	A-3880	22S58	S-55X	
T3	6200Ω CT	6-8Ω	51X201	A-3028	A-3880	22S58	S-55X	

PHONO CARTRIDGE & NEEDLES

*NEEDLE LISTINGS SHOWN ARE FOR RESPECTIVE REPLACEMENT CARTRIDGES ONLY.

ITEM No.	REPLACEMENT DATA								NOTES
	TRUETONE PART No.		ASTATIC PART No.		ELECTRO-VOICE PART No.		SONOTONE PART No.		
	CARTRIDGE	NEEDLE*	CARTRIDGE	NEEDLE*	CARTRIDGE	NEEDLE*	CARTRIDGE	NEEDLE*	
M1			13TB	Not Req.	26S	S1-1 * & S3-3 *	8TA4-S	N-8TAS	

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA			REMARKS
	TRUETONE PART No.	CLEVITE WALCO PART No.	JENSEN PART No.	
M2	(78 RPM)	• W-101STS or • W-102S or • W-101STD	E98 † or E98D †	† Jewel ♦ Diamond • Includes Cartridge
	(LP)		E98X ♦ or E98XD ♦	

MISCELLANEOUS

ITEM No.	PART NAME	TRUETONE PART No.	NOTES
M3	Tuning Cap.	14A235	5 Gang (AM Sections: Ant. 13—332mmf, RF 12—217mmf, Osc. 10—143mmf)
M4	Switch	2A506	Selector (AM-FM-FM AFC) (3 Position)
M5	Switch	2A503	Function (6 Position)

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	10A947-1	Tuner
Knob	10A948-1	Preamp.
Pointer	15X286-1	
Dial Glass	58X818	
Dial Plate	25X2168-1	

WIRING DATA

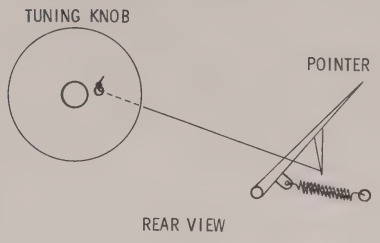
General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No. 1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No. 8401
Phono Pick-up Arm Cable	Use BELDEN No. 8430 (Two Conductor - Twisted)

PHOTOFACT® Folder with CIRCUITRACE®

VICTORIA MODEL TR-650

VICTORIA MODEL TR-650

DIAL CORD STRINGING



VICTORIA MODEL TR-650

TRADE NAME	Victoria Model TR-650
IMPORTER	Capitol Appliance Distributor Div., Capitol Paper Co., 1201 W. Washington Street, Indianapolis, Indiana
TYPE SET	Battery Operated Transistorized Portable AM Receiver
POWER SUPPLY	9 Volts DC
RATING	5MA @ 9 Volts DC (No Signal, Min. Volume) 10MA @ 9 Volts DC (Signal, Normal Volume)
TUNING RANGE—BROADCAST	540 — 1600KC

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested Alignment Tools: A1, A2, A3, A5. GENERAL CEMENT #5009, 8195, 8274, 8275, 8728, 8729, 8987, 8988, 8989
WALSCO #2515, 2531, 2532
A4, A6.....GENERAL CEMENT #5000, 5003, 5066, 8276, 8290, 9087, 9089
WALSCO #2512, 2525, 2528

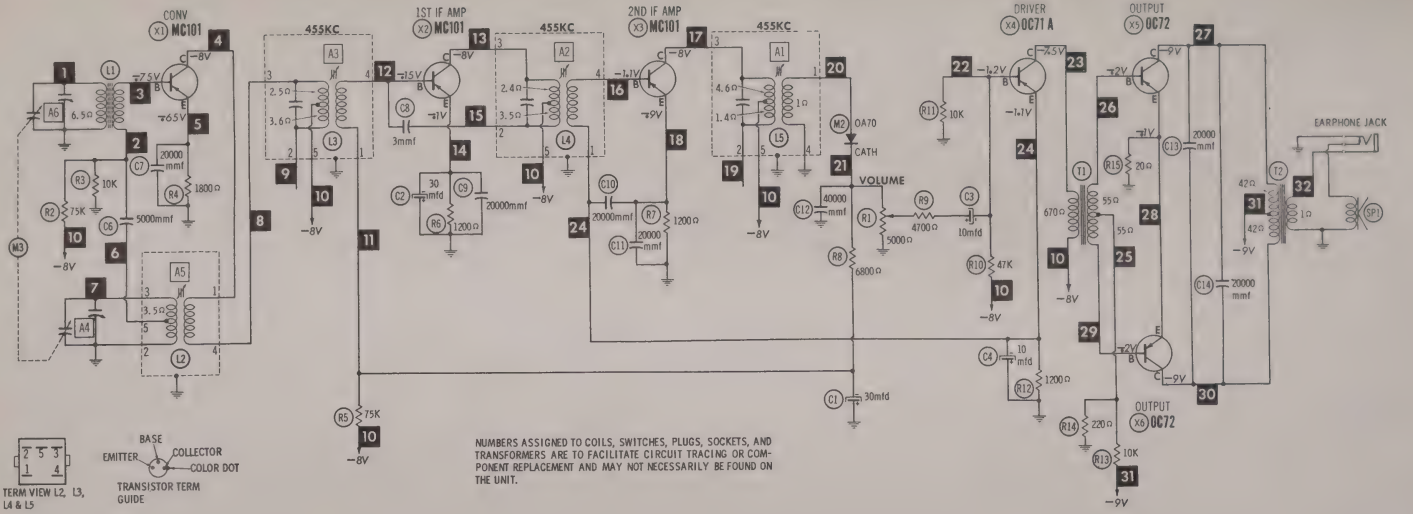
	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	Loop	455KC (400∿ Mod.)	Tuning gang fully open.	Across voice coil.	A1, A2, A3	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
2.	"	1600KC	1600KC	"	A4	"
3.	"	600KC	600KC	"	A5	"
4.	"	1400KC	1400KC Signal.	"	A6	Adjust for maximum output. Repeat Steps 2 thru 4.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1961 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

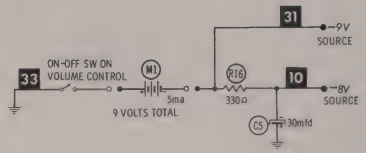
KF231

SET 520 FOLDER 16



1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections or transistor terminals are shown as bottom views.
3. Measured values are from socket pin or terminal to common ground.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

RESISTANCE MEASUREMENTS NOT GIVEN BECAUSE OF THE WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE.



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with CIRCUITRACE®

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VICTORIA MODEL TR-650

PARTS LIST AND DESCRIPTIONS

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA			NOTES
			RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	MC101	Converter				PNP
X2	MC101	1st IF Amplifier				PNP
X3	MC101	2nd IF Amplifier				PNP
X4	OC71A	Driver	2N406	2N362	2N406	PNP
X5	OC72	Output	2N408	2N632	2N408	PNP
X6	OC72	Output	2N408	2N632	2N408	PNP

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	VICTORIA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1	30	6		PTT6030	NLW30-6	TT6X30	ML30-6	TE-1092	
C2	10	3		PTT3010	NLW10-3	TT3X10	MLV10-3	TE-1053	
C3	10	3		PTT3010	NLW10-3	TT3X10	MLV10-3	TE-1053	
C4	30	6		PTT6030	NLW30-6	TT6X30	ML30-6	TE-1092	
C5	30	10		PTT10030	NLW30-15	TT15X30	MLV40-12	TE-1158	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C6	5000		C80V502AM	DM-502	H-05D5	CCD-502	TA-250	TG-D50
C7	20000		C80V203AM	DA-203	H-05S2		TA-120	TG-S20
C8	3		NPO-DI 3	D6-030	C10V3C			
C9	20000		C80V203AM	DA-203	H-05S2		TA-120	TG-S20
C10	20000		C80V203AM	DA-203	H-05S2		TA-120	TG-S20
C11	20000		C80V203AM	DA-203	H-05S2		TA-120	TG-S20
C12	40000							
C13	20000		C80V203AM	DA-203	H-05S2		TA-120	TG-S20
C14	20000		C80V203AM	DA-203	H-05S2		TA-120	TG-S20

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	VICTORIA PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R1	5000Ω	1/4		B16-214				Volume & Switch

RESISTORS (IRC or EQUIVALENT)

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R2	75K	
R3	10K	
R4	1800Ω	
R5	75K	
R6	1200Ω	

ITEM No.	RATING	REMARKS
R7	1200Ω	
R8	6800Ω	
R9	4700Ω	
R10	47K	
R11	10K	

ITEM No.	RATING	REMARKS
R12	1200Ω	
R13	10K	
R14	220Ω	
R15	20Ω	
R16	330Ω	

PRINTED BOARD

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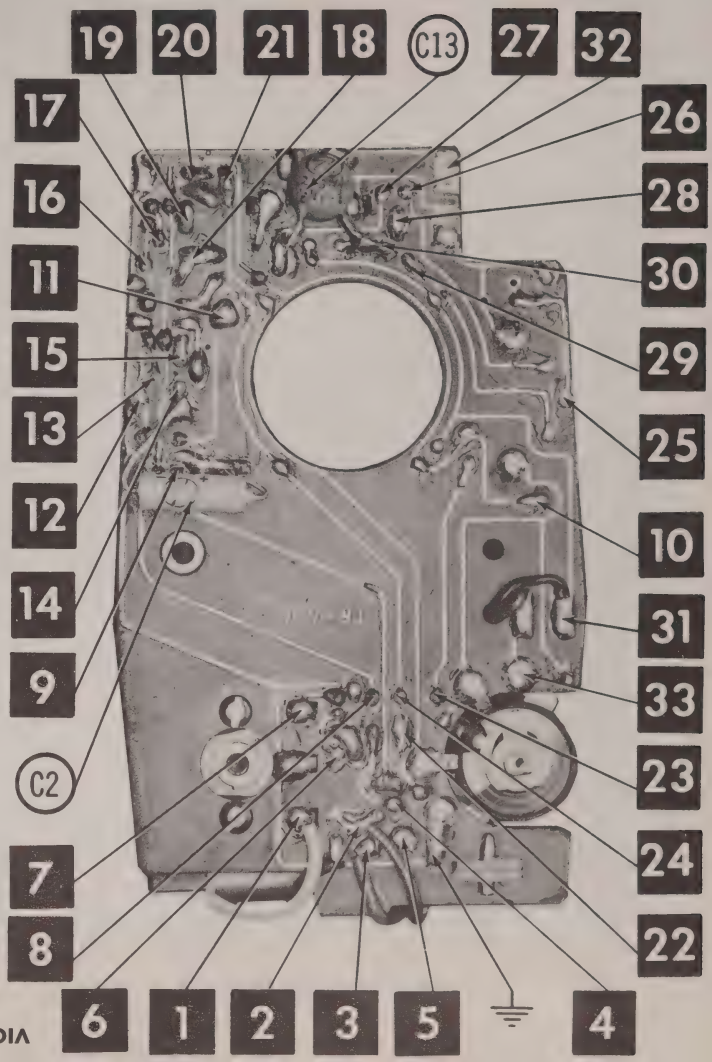


PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA				NOTES
		VICTORIA PART No.	Merit PART No.	Miller PART No.	Stancor PART No.	
L1 L2 L3 L4 L5	Loopstick Osc. Coil 1st IF Trans. 2nd IF Trans. 3rd IF Trans.					

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO		REPLACEMENT DATA					NOTES
	PRI.	SEC.	VICTORIA PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2.3	1						

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA					NOTES
	PRI.	SEC.	VICTORIA PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	1500Ω CT	8-10Ω						

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	VICTORIA PART No.	QUAM PART No.	
SP1	2 1/4"	PM	8-10Ω			

BATTERIES

ITEM No.	VOLTAGE	VICTORIA PART No.	REPLACEMENT DATA						NOTES
			BURGESS		EVEREADY		MALLORY		
			"A"	"B"	"A"	"B"	"A"	"B"	
M1	9V	006P		2U6		216		M-1604	

SIGNAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA				NOTES
		VICTORIA PART No.	GENERAL ELECTRIC PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
M2	0A70			1N60	1N60	Detector (Pigtail)

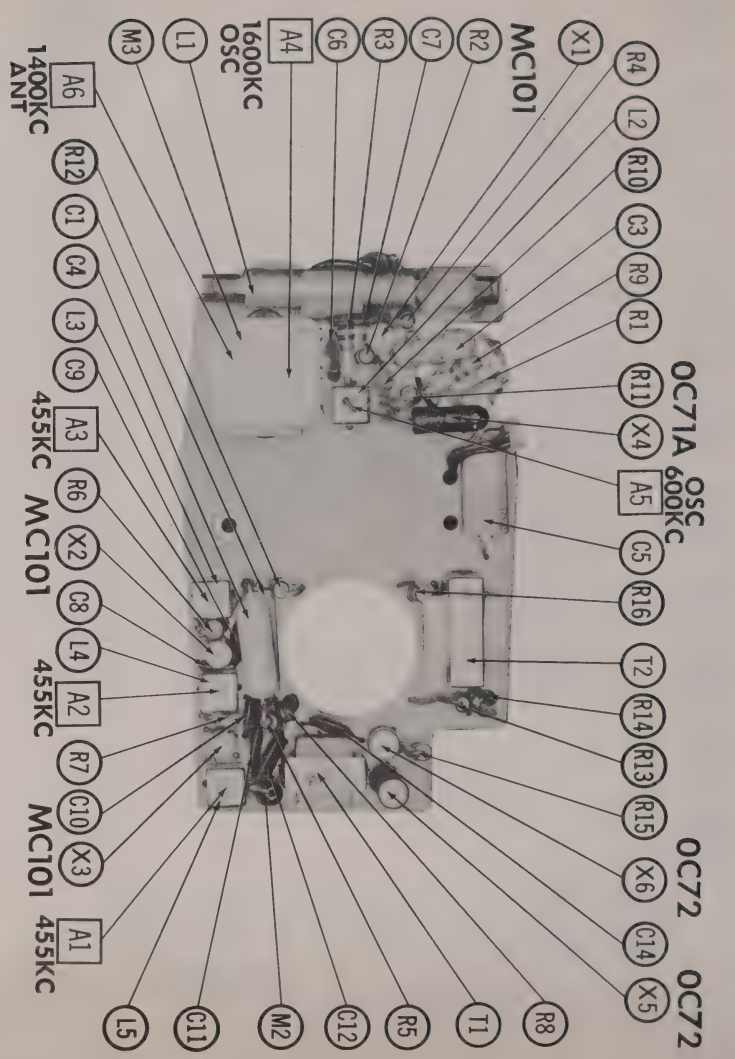
MISCELLANEOUS

ITEM No.	PART NAME	VICTORIA PART No.	NOTES
M3	Tuning Cap.		2 Gang

WIRING DATA

General-use Unshielded Hook-up Wire .....Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

CHASSIS—TOP VIEW



PHOTOFACT® Folder with CIRCUITRACE®

ZENITH MODEL ROYAL 250L, W, Y (CH. 6CT40Z1, 6CT40Z2)

ZENITH MODEL ROYAL
250L, W, Y (CH. 6CT40Z1, 6CT40Z2)

ZENITH MODEL ROYAL
250L, W, Y (CH. 6CT40Z1, 6CT40Z2)

TRADE NAME	Zenith Models Royal 250L, Royal 250W, Royal 250Y (Ch. 6CT40Z1, 6CT40Z2)
MANUFACTURER	Zenith Radio Corp., 6001 Dickens Ave., Chicago 39, Illinois
TYPE SET	Battery Operated Transistorized Portable AM Receiver
POWER SUPPLY	6 Volts DC RATING 9MA @ 6 Volts DC (No Signal, Min. Volume)
TINING RANGE—BROADCAST	540 — 1600KC 20MA @ 6 Volts DC (Signal, Normal Volume)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested Alignment Tools: A1, A2, A3, A5...GENERAL CEMENT #5009, 8195, 8274, 8275, 8728, 8729, 8987, 8988, 8989
WALSCO #2515, 2531, 2532
A4, A6..... GENERAL CEMENT #5004, 5009, 8195, 8274, 8275, 8607, 8728, 8987, 8988, 8989, 9291
WALSCO #2515, 2520, 2522, 2523, 2531, 2532, 2534, 2537, 2538

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	Loop	455KC (400~ Mod.)	600KC	Across voice coil.	A1, A2, A3	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
2.	"	1620KC	Tuning gang fully open.	"	A4	"
3.	"	535KC	Tuning gang fully closed.	"	A5	Adjust for maximum output. Repeat Steps 2 and 3.
4.	"	1260KC	1260KC	"	A6	Adjust for maximum output.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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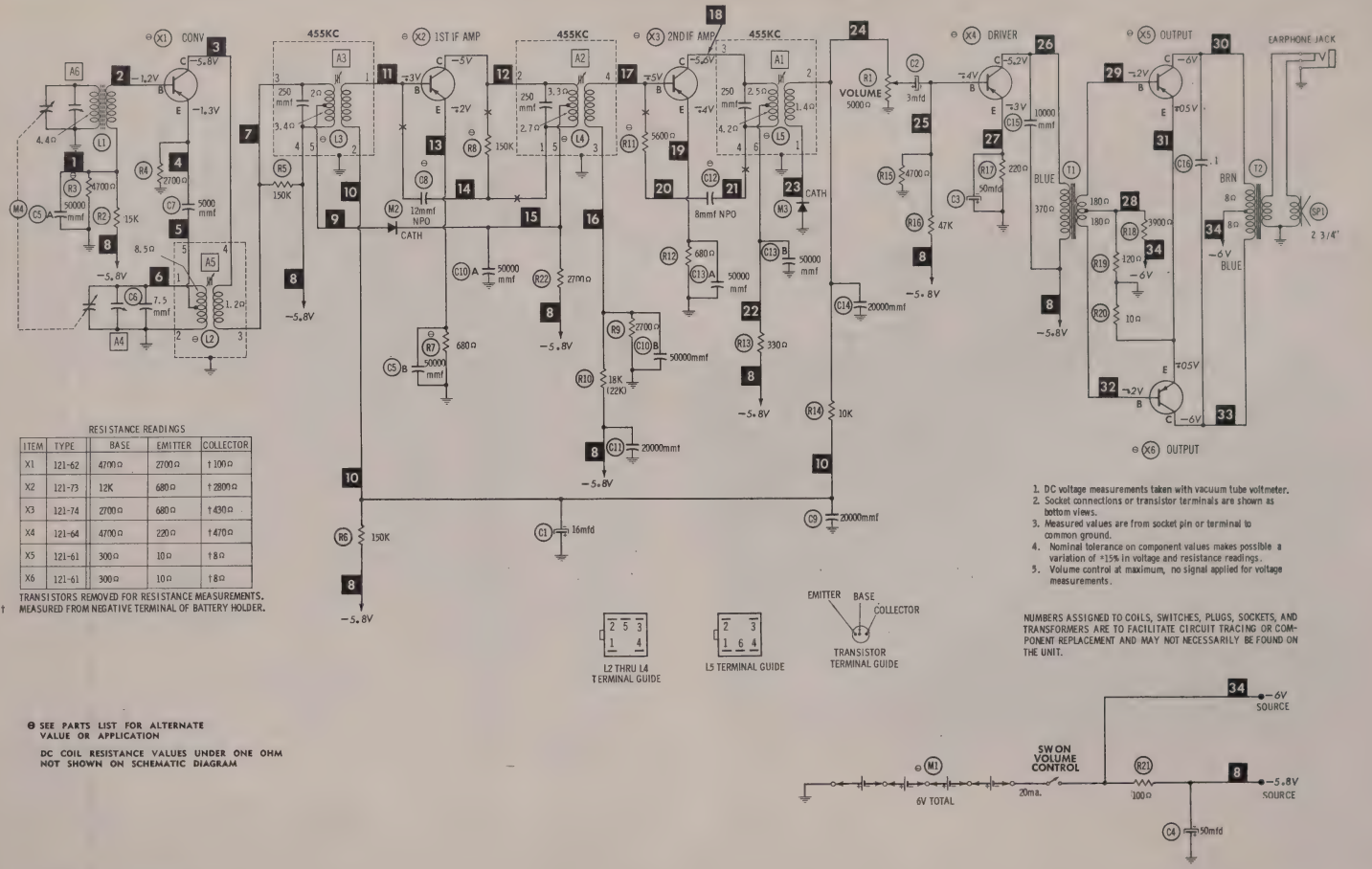
KF195

SET 520 FOLDER 17



RESISTANCE READINGS

ITEM	TYPE	BASE	EMITTER	COLLECTOR
X1	121-62	4700Ω	2700Ω	†100Ω
X2	121-73	12K	680Ω	†2800Ω
X3	121-74	2700Ω	680Ω	†430Ω
X4	121-64	4700Ω	220Ω	†470Ω
X5	121-61	300Ω	10Ω	†8Ω
X6	121-61	300Ω	10Ω	†8Ω

TRANSISTORS REMOVED FOR RESISTANCE MEASUREMENTS.
† MEASURED FROM NEGATIVE TERMINAL OF BATTERY HOLDER.

1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections or transistor terminals are shown as bottom views.
3. Measured values are from socket pin or terminal to common ground.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUITRACE®

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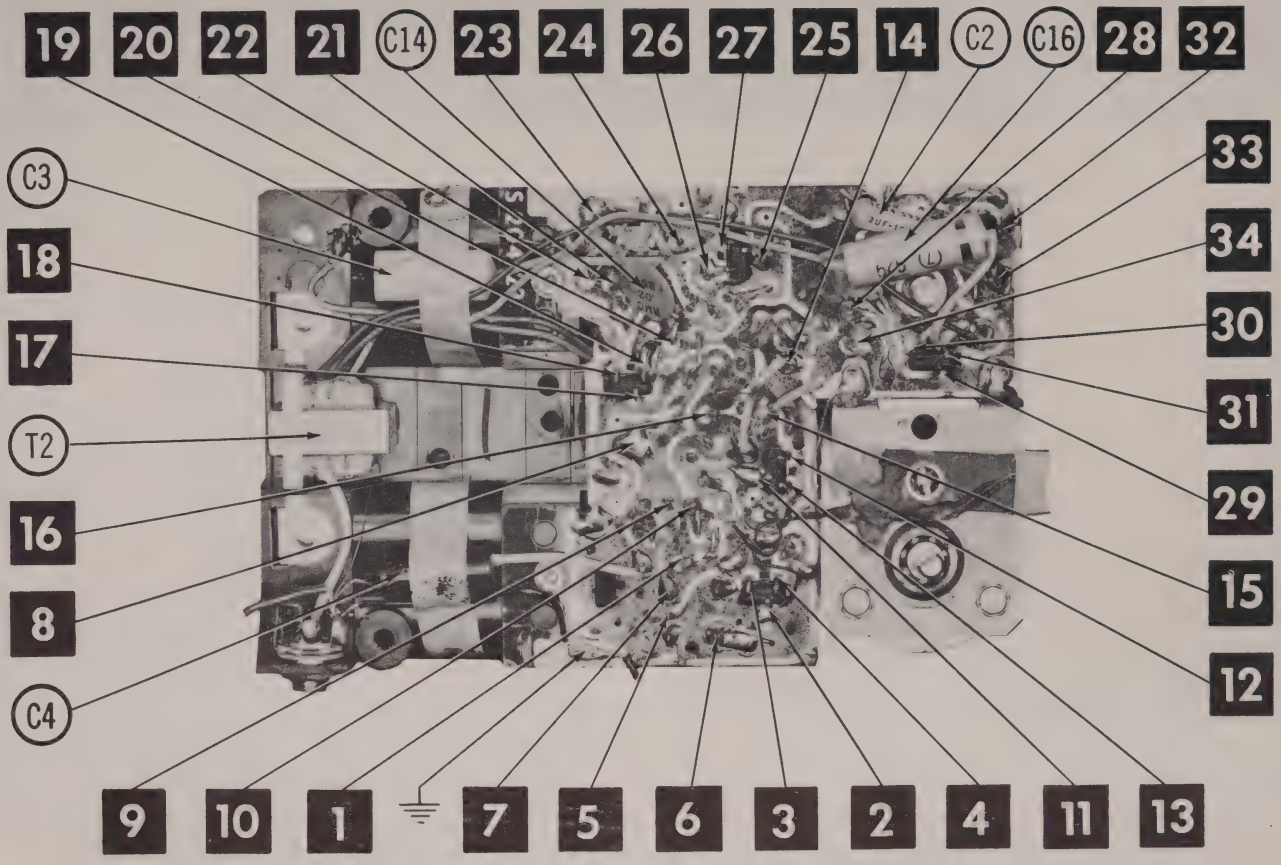
ZENITH MODEL ROYAL 250L, W, Y (CH. 6CT40Z1, 6CT40Z2)



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PRINTED BOARD

PARTS LIST AND DESCRIPTIONS

TRANSISTORS

ITEM No.	MFGR. PART NO.	USE	REPLACEMENT DATA			NOTES
			RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	121-62 ♦	Converter	2N411	2N486	2N141	PNP
	121-54 *	Converter				
X2	121-73 ♦	1st IF Amplifier	2N409	2N483	2N409	PNP
	121-113 *	1st IF Amplifier				
X3	121-74 ♦	2nd IF Amplifier	2N409	2N483	2N409	PNP
	121-67 *	2nd IF Amplifier				
X4	121-64 ♦	Driver	2N407	2N362	2N407	PNP
	121-52 *	Driver				
X5	121-61 ♦	Output	2N407	2N632	2N407	PNP } Matched Pair
	121-19 *	Output				
X6	121-61 ♦	Output	2N407	2N632	2N407	PNP } Matched Pair
	121-19 *	Output				

♦ Used in Chassis 6CT40Z2.
* Used in Chassis 6CT40Z1.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	ZENITH PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1	16	3	22-2871	PTT3015	NLW15-12	TT6X15	MLV25-3	TE-1053.5	
C2	3	12	22-2884	PTT25003	NLW3-25	TT12X3	MLV5-12	TE-1122	
C3	50	6	22-2726	PWE6050	NLW50-10	TT6X50	ML50-6	TE-1100	
C4	50	6	22-2726	PWE6050	NLW50-10	TT6X50	ML50-6	TE-1100	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C5A	50000			DA-503	H-05S5		TA-150	TG-S50
B	50000			DA-503	H-05S5		TA-150	TG-S50
C6	7.5			DD-7R5				10TS-V75
C7	5000 25V		BPD-005	DM-502	H-05D5	CCD-502	TA-250	TG-D50
C8	12 NPO	Note 1	NPO-DI 12	TC2-12		CCTO-120	CNO-412	10TCC-Q12
C9	20000 25V			DA-203	H-05S2		TA-120	TG-S20
C10A	50000			DA-503	H-05S5		TA-150	TG-S50
B	50000			DA-503	H-05S5		TA-150	TG-S50
C11	20000			DA-203	H-05S2		TA-120	TG-S20
C12	8 NPO	Note 1	NPO-DI 8.2		C10V8C			
C13A	50000			DA-503	H-05S5		TA-150	TG-S50
B	50000			DA-503	H-05S5		TA-150	TG-S50

FIXED CAPACITORS (cont)

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C14	20000 25V			DA-203	H-05S2		TA-120	TG-S20
C15	10000 25V			DM-103	H-05S1		TA-110	TG-S10
C16	.1 50V		V84C2P1		WMF4P1E			

Note 1. Not used in Chassis 6CT40Z1.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	ZENITH PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.	
R1A B	5000Ω Switch	1/4	63-4603					Volume Power Off-On

RESISTORS (IRC or EQUIVALENT)

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R2	15K	
R3	4700Ω	Note 1
R4	2700Ω	
R5	150K	
R6	150K	
R7	680Ω	Note 2
R8	150K	Note 3

ITEM No.	RATING	REMARKS
R9	2700Ω	
R10	18K	(22K) *
R11	5600Ω	Note 3
R12	680Ω	
R13	330Ω	
R14	10K	
R15	4700Ω	

ITEM No.	RATING	REMARKS
R16	47K	
R17	220Ω	
R18	3900Ω	
R19	120Ω	
R20	10Ω	
R21	100Ω	
R22	2700Ω	

Note 1. Chassis 6CT40Z1 use 5600Ω in this application.
Note 2. Chassis 6CT40Z1 use 1000Ω in this application.
Note 3. Not used in Chassis 6CT40Z1.
* Alternate Value.

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA				NOTES
		ZENITH PART No.	Merit PART No.	Miller PART No.	Stancor PART No.	
L1	Loopstick	S-46800		2005		① Part #95-1676 used in Chassis 6CT40Z1.
L2	Osc. Coil	95-1689①				② Part #95-1687 used in Chassis 6CT40Z1.
L3	1st IF Trans.	95-1688②				③ Part #95-1601 used in Chassis 6CT40Z1.
L4	2nd IF Trans.	95-1595③				④ Part #95-1602 used in Chassis 6CT40Z1.
L5	3rd IF Trans.	95-1586④				

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO		REPLACEMENT DATA					NOTES
	PRI.	SEC.	ZENITH PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	1	1	95-1518		TA-30①	TR-2①	T-33X①	① Remove Frame

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA					NOTES
	PRI.	SEC.	ZENITH PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	425Ω CT	14-16Ω	95-1519			TR-18		

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	ZENITH PART No.	QUAM PART No.	
SP1	2 3/4"	PM	14-16Ω	49-891	27A06Z16.6	

BATTERIES

ITEM No.	VOLTAGE	ZENITH PART No.	REPLACEMENT DATA						NOTES
			BURGESS		EVEREADY		MALLORY		
			"A"	"B"	"A"	"B"	"A"	"B"	
M1	1.5V	Z8 * or Z9 †							* 4 Required † 4 Required (Mercury Type)

SIGNAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA				NOTES
		ZENITH PART No.	GENERAL ELECTRIC PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
M2		103-19		1N295	1N295	Overload & AVC (Pigtail)
M3		103-19		1N295	1N295	Detector (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	ZENITH PART No.	NOTES
M4	Tuning Cap. Printed Board	22-3168 S204-23	2 Gang (Ant. 11-135mmf)

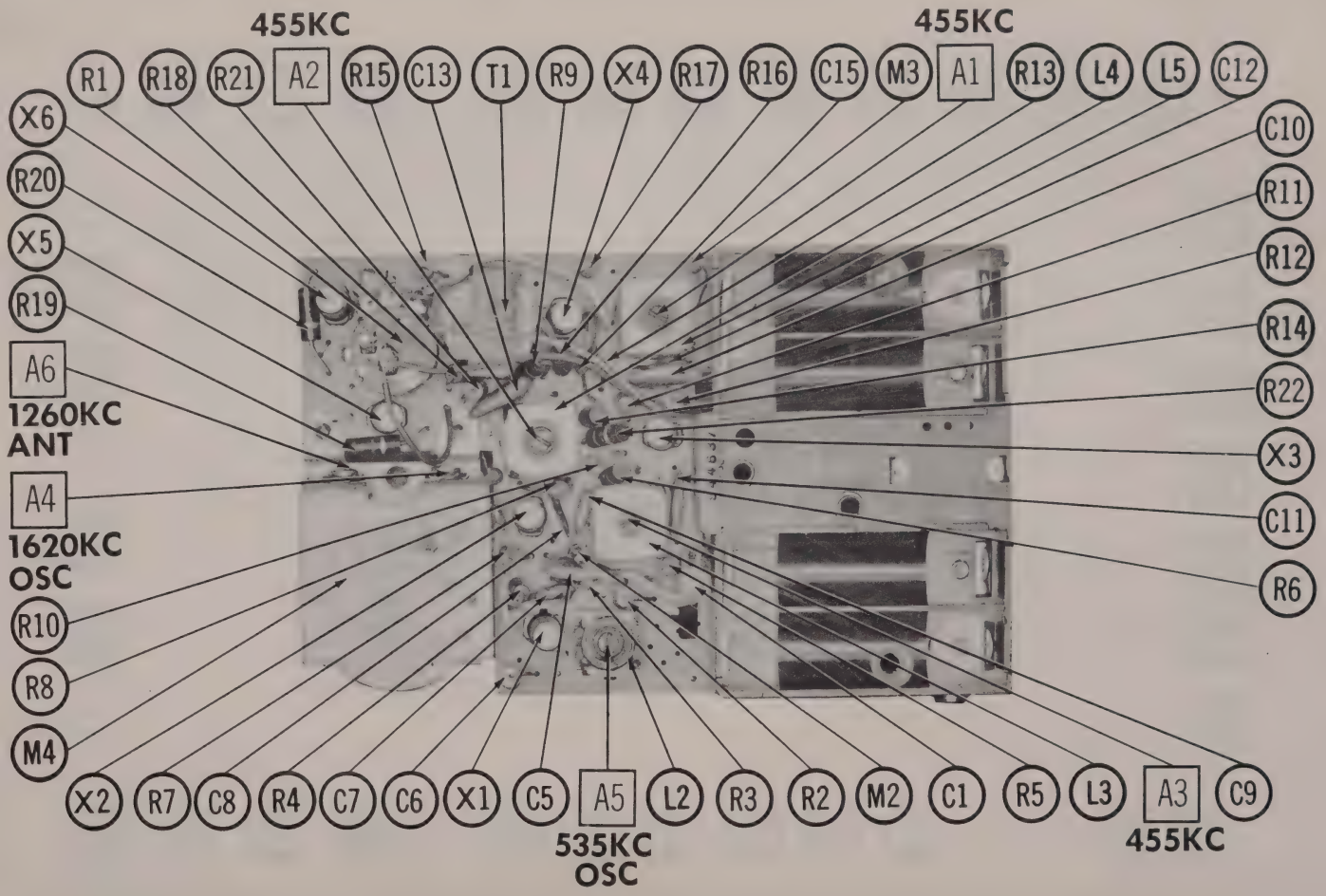
CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

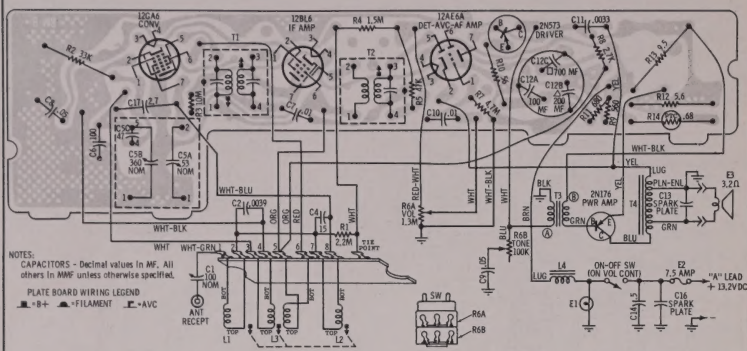
NAME	PART NO.	DESCRIPTION
Knob	S-46803	Tuning
Knob	S-46804	Volume, With Ring Assembly
Cabinet Front	14-2732	Model Royal 250Y
Cabinet Front	14-2733	Model Royal 250L
Cabinet Front	14-2734	Model Royal 250W
Cabinet Rear	14-2742	Model Royal 250Y
Cabinet Rear	14-2745	Model Royal 250L
Cabinet Rear	14-2746	Model Royal 250W

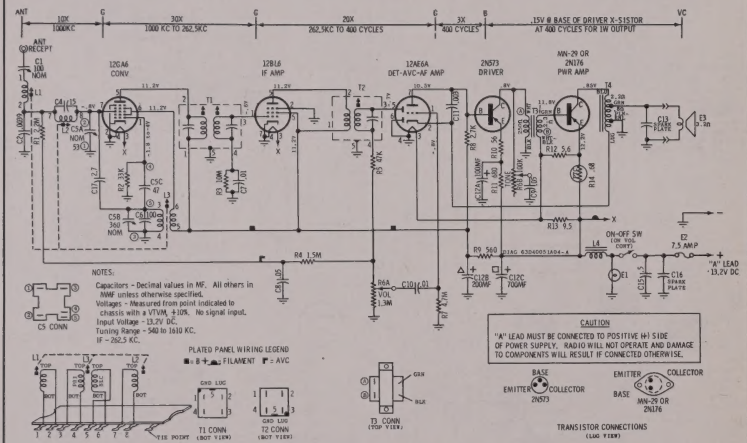
WIRING DATA

General-use Unshielded Hook-up Wire .....Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors



CHASSIS TOP VIEW

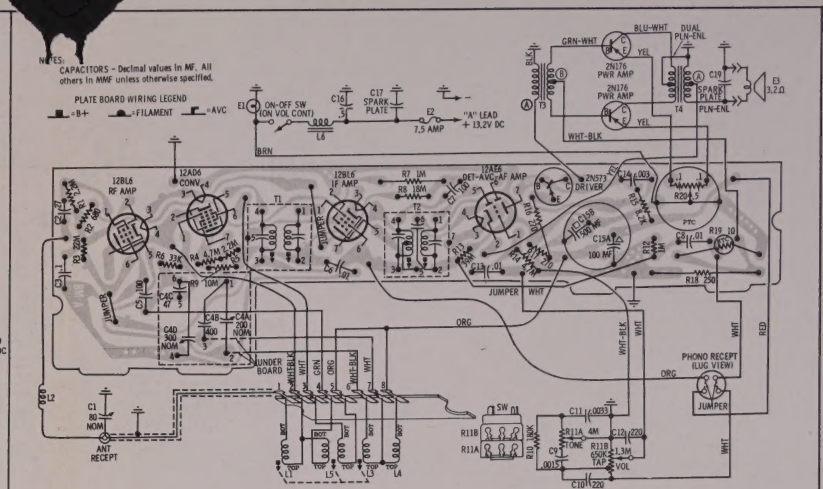


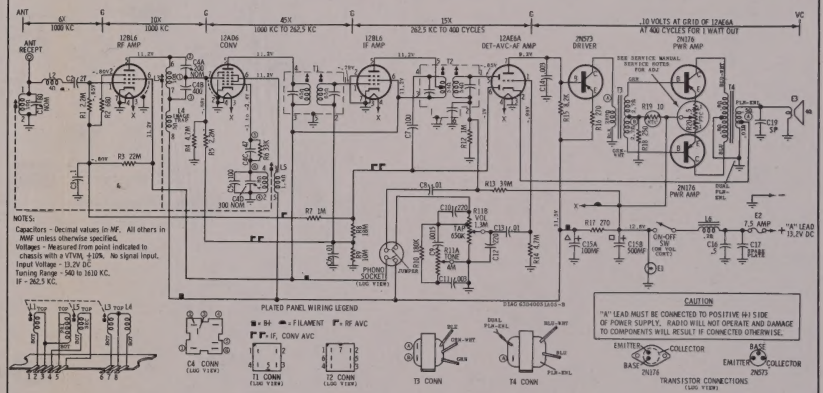

ANT
10X
1000KC
30X
1000 KC TO 262.5KC
20X
262.5KC TO 400 CYCLES
3X
400 CYCLES
.15V @ BASE OF DRIVER X-SISTOR AT 400 CYCLES FOR 1W OUTPUT
VC
12GA6 CONV
12BL6 IF AMP
12AE6A DET-AVC-AF AMP
2N573 DRIVER
MN-29 OR 2N176 PWR AMP
ON-OFF SW (ON VOL CONT)
7.5 AMP
"A" LEAD 13.2V DC
NOTES:
Capacitors - Decimal values in MF. All others in MMF unless otherwise specified.
Voltages - Measured from point indicated to chassis with a VTVM, ±10%. No signal input.
Input Voltage - 13.2V DC.
Tuning Range - 540 to 1610 KC.
IF - 262.5 KC.
CAUTION
"A" LEAD MUST BE CONNECTED TO POSITIVE (+) SIDE OF POWER SUPPLY. RADIO WILL NOT OPERATE AND DAMAGE TO COMPONENTS WILL RESULT IF CONNECTED OTHERWISE.
PLATED PANEL WIRING LEGEND
=B+ =FILAMENT =AVC
C5 CONN
T1 CONN (BOT VIEW)
T2 CONN (BOT VIEW)
T3 CONN (TOP VIEW)
TRANSISTOR CONNECTIONS (LUG VIEW)
2N573
MN-29 OR 2N176

MODELS 109,111,113,114

MOPAR MODELS 109, 111, 113, 114

Schematic Diagram Courtesy of Motorola Inc.




ANT
6X
1000 KC
10X
1000 KC
45X
1000 KC TO 262.5 KC
15X
262.5 KC TO 400 CYCLES
VC
.10 VOLTS AT GRID OF 12AE6A AT 400 CYCLES FOR 1 WATT OUT
12BL6 RF AMP
12AD6 CONV
12BL6 IF AMP
12AE6A DET-AVC-AF AMP
2N573 DRIVER
2N176 PWR AMP
ON-OFF SW (ON VOL CONT)
7.5 AMP
"A" LEAD 13.2V DC
NOTES:
Capacitors - Decimal values in MF. All others in MMF unless otherwise specified.
Voltages - Measured from point indicated to chassis with a VTVM, ±10%. No signal input.
Input Voltage - 13.2V DC
Tuning Range - 540 to 1610 KC.
IF - 262.5 KC.
PHONO SOCKET (LUG VIEW)
PLATED PANEL WIRING LEGEND
=B+ =FILAMENT =RF AVC
=IF, CONV AVC
C4 CONN (LUG VIEW)
T1 CONN (LUG VIEW)
T2 CONN (LUG VIEW)
T3 CONN
T4 CONN
CAUTION
"A" LEAD MUST BE CONNECTED TO POSITIVE (+) SIDE OF POWER SUPPLY. RADIO WILL NOT OPERATE AND DAMAGE TO COMPONENTS WILL RESULT IF CONNECTED OTHERWISE.
TRANSISTOR CONNECTIONS (LUG VIEW)
2N176
2N573

MODELS 309,311,314L,314W

MOPAR MODELS 309, 311, 314L, 314W

Schematic Diagram Courtesy of Motorola Inc.

← MOPAR

SYLVANIA

USE POWER LINE ISOLATION TRANSFORMER WHEN SERVICING THE CHASSIS.
PICTURE TUBE HIGH VOLTAGE ANODE LEAD MAY HAVE A POTENTIAL OF 16,000 VOLTS.
OBSERVE ALL HIGH VOLTAGE PRECAUTIONS WHEN SERVICING THE CHASSIS. DO NOT OPERATE THE RECEIVER WITH THE HIGH VOLTAGE COVER REMOVED. USE SAFETY GOGGLES AND GLOVES WHEN HANDLING THE PICTURE TUBE.

VOLTAGE MEASUREMENT CONDITIONS UNLESS OTHERWISE SPECIFIED

1. Voltages measured to chassis using VTVM.
2. AC power source 117V 60 cycle line.
3. Voltage readings in brackets taken with no signal input; channel selector set to a free channel. Antenna disconnected. Antenna terminals shorted together and grounded to chassis.
4. Voltage readings not in brackets taken with a strong signal input; tuner set to strong local station developing approximately 5 volts on IF AGC Buss test point (E), (junction of R206 and R205).
5. Contrast control set to maximum. Brightness control set to minimum.
6. Voltage values shown are average readings. Variations may be observed due to normal production tolerances.

SPECIAL VOLTAGE MEASUREMENT CONDITIONS

(B) Picture tube anode voltage measured with VTVM high voltage probe at line voltage of 117 volts under conditions of normal signal. No brightness and correct scan size.

▲ High peak voltage of short duration may damage meter used for this measurement.

WAVEFORM MEASUREMENT CONDITIONS

1. Channel selector set to strong channel.
2. Contrast control set for signal of 60 volt peak to peak at yellow lead of picture tube.
3. Waveforms measured with respect to chassis using a wide band oscilloscope. (other type oscilloscopes may alter waveform shapes or amplitudes.
4. The terms "30 ~ " or "7875 ~ " refer to scope sweep frequency used.

V1A 1/2 5BR8 SOUND IF AMP
V2A 1/2 6BN8 RATIO DET.
V2B 1/2 6BN8 AUDIO AMP
V3 5AQ5 AUDIO OUTPUT
V4 3B26 1ST VIDEO IF AMP
V5 3B26 2ND VIDEO IF AMP
V6 3B26 3RD VIDEO IF AMP
V7A 1/2 8ET7 VIDEO AMP
V7B 1/2 8ET7 A.F.C. DISCR
V8 3CS6 SYNC. SEP & NOISE GATE
V9 10EG7 VERT. OSC & OUTPUT
V10 6GG7 HORIZ. OSC.
V11 12DQ6A HORIZ. OUTPUT
V12 1G3GT/1B3GT H.V. RECTIFIER
V13 12AX4GTA DAMPER
V14 19AUP4 PIX TUBE
V1B 1/2 5BR8 AGC AMP

SYLVANIA MODELS 19P10, 19P11 (CH. 546-1, -2)

Schematic Diagram Courtesy of Sylvania Electric Products Inc.

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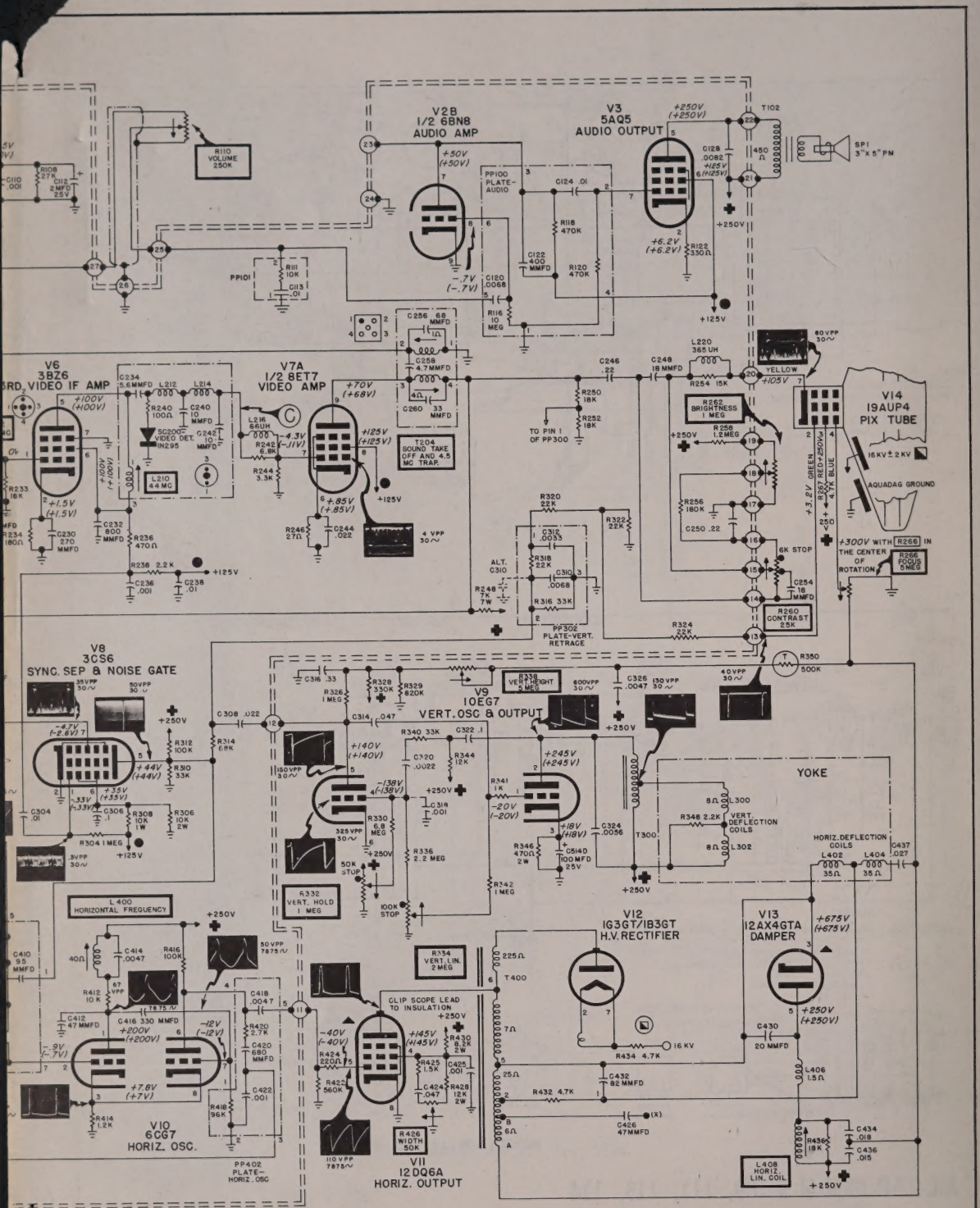
SET 520 FOLDER 18-S



Schematic Diagram Courtesy of Sylvania Electric Products Inc.